Service Manual

Model : GS107

Service Manual

GS107

Date: February, 2010 / Issue 1.0

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1. INTRODUCTION

1.1 Purpose

This manual provides the information necessary to repair, calibration, description and download the features of this model.

1.2 Regulatory Information

A. Security

Toll fraud, the unauthorized use of telecommunications system by an unauthorized part (for example, persons other than your company's employees, agents, subcontractors, or person working on your company's behalf) can result in substantial additional charges for your telecommunications services. System users are responsible for the security of own system. There are may be risks of toll fraud associated with your telecommunications system. System users are responsible for programming and configuring the equipment to prevent unauthorized use. The manufacturer does not warrant that this product is immune from the above case but will prevent unauthorized use of common-carrier telecommunication service of facilities accessed through or connected to it. The manufacturer will not be responsible for any charges that result from such unauthorized use.

B. Incidence of Harm

If a telephone company determines that the equipment provided to customer is faulty and possibly causing harm or interruption in service to the telephone network, it should disconnect telephone service until repair can be done. A telephone company may temporarily disconnect service as long as repair is not done.

C. Changes in Service

A local telephone company may make changes in its communications facilities or procedure. If these changes could reasonably be expected to affect the use of the this phone or compatibility with the network, the telephone company is required to give advanced written notice to the user, allowing the user to take appropriate steps to maintain telephone service.

D. Maintenance Limitations

Maintenance limitations on this model must be performed only by the manufacturer or its authorized agent. The user may not make any changes and/or repairs expect as specifically noted in this manual. Therefore, note that unauthorized alternations or repair may affect the regulatory status of the system and may void any remaining warranty.

E. Notice of Radiated Emissions

This model complies with rules regarding radiation and radio frequency emission as defined by local regulatory agencies. In accordance with these agencies, you may be required to provide information such as the following to the end user.

F. Pictures

The pictures in this manual are for illustrative purposes only; your actual hardware may look slightly different.

G. Interference and Attenuation

Phone may interfere with sensitive laboratory equipment, medical equipment, etc.Interference from unsuppressed engines or electric motors may cause problems.

H. Electrostatic Sensitive Devices

ATTENTION

Boards, which contain Electrostatic Sensitive Device (ESD), are indicated by the sign. Following information is ESD handling:

- Service personnel should ground themselves by using a wrist strap when exchange system boards.
- When repairs are made to a system board, they should spread the floor with anti-static mat which is also grounded.
- Use a suitable, grounded soldering iron.
- Keep sensitive parts in these protective packages until these are used.
- When returning system boards or parts like EEPROM to the factory, use the protective package as described.

1.3 Abbreviations

For the purposes of this manual, following abbreviations apply:

APC	Automatic Power Control
BB	Baseband
BER	Bit Error Ratio
CC-CV	Constant Current – Constant Voltage
DAC	Digital to Analog Converter
DCS	Digital Communication System
dBm	dB relative to 1 milli watt
DSP	Digital Signal Processing
EEPROM	Electrical Erasable Programmable Read-Only Memory
ESD	Electrostatic Discharge
FPCB	Flexible Printed Circuit Board
GMSK	Gaussian Minimum Shift Keying
GPIB	General Purpose Interface Bus
GSM	Global System for Mobile Communications
IPUI	International Portable User Identity
IF	Intermediate Frequency
LCD	Liquid Crystal Display
LDO	Low Drop Output
LED	Light Emitting Diode
OPLL	Offset Phase Locked Loop

PAM	Power Amplifier Module
PCB	Printed Circuit Board
PGA	Programmable Gain Amplifier
PLL	Phase Locked Loop
PSTN	Public Switched Telephone Network
RF	Radio Frequency
RLR	Receiving Loudness Rating
RMS	Root Mean Square
RTC	Real Time Clock
SAW	Surface Acoustic Wave
SIM	Subscriber Identity Module
SLR	Sending Loudness Rating
SRAM	Static Random Access Memory
PSRAM	Pseudo SRAM
STMR	Side Tone Masking Rating
TA	Travel Adapter
TDD	Time Division Duplex
TDMA	Time Division Multiple Access
UART	Universal Asynchronous Receiver/Transmitter
VCO	Voltage Controlled Oscillator
VCTCXO	Voltage Control Temperature Compensated Crystal Oscillator
WAP	Wireless Application Protocol

2. PERFORMANCE

2.1 H/W Features

Item	Feature	Comment
Standard Battery	Lithium-ion r, 3.7V 950mAh	
Stand by TIME	Up to 720 hrs : Paging Period 9, RSSI 85dBm	
Talk time	Up to 600 min : GSM Tx Level 10	
Charging time	Approx. 4 hours	
RX Sensitivity	GSM, EGSM: -108dBm, DCS: -108dBm	
TX output power	GSM, EGSM: 32.5dBm(Level 5), DCS , PCS: 29.5dBm(Level 0)	
GPRS compatibility	Not Support	
SIM card type	3V Small	
Display	MAIN : 1.5" 128 x 128 65K TFT	
Status Indicator	Hard icons. Key Pad 0 ~ 9, #, *, Up/Down Left/Right Navigation Key Send Key, PWR Key ,Soft Key(Left/Right)	
ANT	Internal	
EAR Phone Jack	Yes	
PC Synchronization	Not Support	
Speech coding	EFR/FR/HR	
Data and Fax	Yes	
Vibrator	Yes	
Loud Speaker	Yes	
Voice Recoding	Not Support	
Microphone	Yes	

2. PERFORMANCE

Item	Feature	Comment
Speaker/Receiver	18x12Φ Speaker/ Receiver	
Travel Adapter	Yes	
MIDI	32 poly	
Camera	Not Support	
FM Radio	87~108MHz supported	

2.2 Technical Specification

<table>
<tr><th>Item</th><th>Description</th><th>Specification</th></tr>
<tr><td>1</td><td>Frequency Band</td><td>EGSM
TX: 880 ~ 915MHz
RX: 925 ~ 960 MHz

DCS
TX: 1710 ~ 1785 MHz
RX: 1805 ~ 1880 MHz</td></tr>
<tr><td>2</td><td>Phase Error</td><td>RMS < 5 degrees
Peak < 20 degrees</td></tr>
<tr><td>3</td><td>Frequency Error</td><td>< 0.1 ppm</td></tr>
<tr><td>4</td><td>Power Level</td><td>
GSM850/EGSM
<table>
<tr><th>Level</th><th>Power</th><th>Toler.</th><th>Level</th><th>Power</th><th>Toler.</th></tr>
<tr><td>5</td><td>33dBm</td><td>±2dB</td><td>13</td><td>17dBm</td><td>± 3dB</td></tr>
<tr><td>6</td><td>31dBm</td><td>±3dB</td><td>14</td><td>15dBm</td><td>± 3dB</td></tr>
<tr><td>7</td><td>29dBm</td><td>±3dB</td><td>15</td><td>13dBm</td><td>± 3dB</td></tr>
<tr><td>8</td><td>27dBm</td><td>±3dB</td><td>16</td><td>11dBm</td><td>± 5dB</td></tr>
<tr><td>9</td><td>25dBm</td><td>±3dB</td><td>17</td><td>9dBm</td><td>± 5dB</td></tr>
<tr><td>10</td><td>23dBm</td><td>±3dB</td><td>18</td><td>7dBm</td><td>± 5dB</td></tr>
<tr><td>11</td><td>21dBm</td><td>±3dB</td><td>19</td><td>5dBm</td><td>± 5dB</td></tr>
<tr><td>12</td><td>19dBm</td><td>±3dB</td><td></td><td></td><td></td></tr>
</table>
DCS/PCS
<table>
<tr><th>Level</th><th>Power</th><th>Toler.</th><th>Level</th><th>Power</th><th>Toler.</th></tr>
<tr><td>0</td><td>30dBm</td><td>±2dB</td><td>8</td><td>14dBm</td><td>± 3dB</td></tr>
<tr><td>1</td><td>28dBm</td><td>±3dB</td><td>9</td><td>12dBm</td><td>± 4dB</td></tr>
<tr><td>2</td><td>26dBm</td><td>±3dB</td><td>10</td><td>10dBm</td><td>± 4dB</td></tr>
<tr><td>3</td><td>24dBm</td><td>±3dB</td><td>11</td><td>8dBm</td><td>± 4dB</td></tr>
<tr><td>4</td><td>22dBm</td><td>±3dB</td><td>12</td><td>6dBm</td><td>± 4dB</td></tr>
<tr><td>5</td><td>20dBm</td><td>±3dB</td><td>13</td><td>4dBm</td><td>± 4dB</td></tr>
<tr><td>6</td><td>18dBm</td><td>±3dB</td><td>14</td><td>2dBm</td><td>± 5dB</td></tr>
<tr><td>7</td><td>16dBm</td><td>±3dB</td><td>15</td><td>0dBm</td><td>± 5dB</td></tr>
</table>
</td></tr>
</table>

Item	Description	Specification	
5	Output RF Spectrum (due to modulation)	**GSM850/ EGSM**	
		Offset from Carrier (kHz).	Max. dBc
		100	+0.5
		200	-30
		250	-33
		400	-60
		600~ <1,200	-60
		1,200~ <1,800	-60
		1,800~ <3,000	-63
		3,000~ <6,000	-65
		6,000	-71
		DCS/PCS	
		Offset from Carrier (kHz).	Max. dBc
		100	+0.5
		200	-30
		250	-33
		400	-60
		600~ <1,200	-60
		1,200~ <1,800	-60
		1,800~ <3,000	-65
		3,000~ <6,000	-65
		6,000	-73
6	Output RF Spectrum (due to switching transient)	**GSM850/ EGSM**	
		Offset from Carrier (kHz).	Max. dBm
		400	-19
		600	-21
		1,200	-21
		1,800	-24

<table>
<tr><th>Item</th><th>Description</th><th colspan="3">Specification</th></tr>
<tr><td rowspan="6">6</td><td rowspan="6">Output RF Spectrum
(due to switching
transient)</td><td colspan="3">DCS/PCS</td></tr>
<tr><td colspan="2">Offset from Carrier (kHz).</td><td>Max. dBm</td></tr>
<tr><td colspan="2">400</td><td>-22</td></tr>
<tr><td colspan="2">600</td><td>-24</td></tr>
<tr><td colspan="2">1,200</td><td>-24</td></tr>
<tr><td colspan="2">1,800</td><td>-27</td></tr>
<tr><td>7</td><td>Spurious Emissions</td><td colspan="3">Conduction, Emission Status</td></tr>
<tr><td>8</td><td>Bit Error Ratio</td><td colspan="3">GSM850, EGSM
BER (Class II) < 2.439% @-102 dBm
DCS,PCS
BER (Class II) < 2.439% @-100 dBm</td></tr>
<tr><td>9</td><td>RX Level Report Accuracy</td><td colspan="3">±3 dB</td></tr>
<tr><td>10</td><td>SLR</td><td colspan="3">13±4 dB</td></tr>
<tr><td rowspan="10">11</td><td rowspan="10">Sending Response</td><td>Frequency (Hz)</td><td>Max.(dB)</td><td>Min.(dB)</td></tr>
<tr><td>100</td><td>-12</td><td>-</td></tr>
<tr><td>200</td><td>0</td><td>-</td></tr>
<tr><td>300</td><td>0</td><td>-12</td></tr>
<tr><td>1,000</td><td>0</td><td>-6</td></tr>
<tr><td>2,000</td><td>4</td><td>-6</td></tr>
<tr><td>3,000</td><td>4</td><td>-6</td></tr>
<tr><td>3,400</td><td>4</td><td>-9</td></tr>
<tr><td>4,000</td><td>0</td><td>-</td></tr>
<tr><td>12</td><td>RLR</td><td colspan="3">2±3 dB</td></tr>
</table>

2. PERFORMANCE

<table>
<tr><th>Item</th><th>Description</th><th colspan="3">Specification</th></tr>
<tr><td rowspan="11">13</td><td rowspan="11">Receiving Response</td><td>Frequency (Hz)</td><td>Max.(dB)</td><td>Min.(dB)</td></tr>
<tr><td>100</td><td>-12</td><td>-</td></tr>
<tr><td>200</td><td>0</td><td>-</td></tr>
<tr><td>300</td><td>2</td><td>-7</td></tr>
<tr><td>500</td><td>*</td><td>-5</td></tr>
<tr><td>1,000</td><td>0</td><td>-5</td></tr>
<tr><td>3,000</td><td>2</td><td>-5</td></tr>
<tr><td>3,400</td><td>2</td><td>-10</td></tr>
<tr><td>4,000</td><td>2</td><td></td></tr>
<tr><td colspan="3">* Mean that Adopt a straight line in between 300 Hz and 1,000 Hz to be Max. level in the range.</td></tr>
<tr><td>14</td><td>STMR</td><td colspan="3">≥ 17 dB</td></tr>
<tr><td>15</td><td>Stability Margin</td><td colspan="3">> 6 dB</td></tr>
<tr><td>16</td><td>System frequency (13 MHz) tolerance</td><td colspan="3">≤ 2.5 ppm</td></tr>
<tr><td>17</td><td>32.768KHz tolerance</td><td colspan="3">≤ 30 ppm</td></tr>
<tr><td>18</td><td>Ringer Volume</td><td colspan="3">At least 65 dBspl under below conditions:
1. Ringer set as ringer.
2. Test distance set as 50 cm</td></tr>
<tr><td>19</td><td>Charge Current</td><td colspan="3">Fast Charge : Typ. 410 mA
Total Charging Time : < 3.5 hours</td></tr>
</table>

<table>
<tr><th>Item</th><th>Description</th><th colspan="2">Specification</th></tr>
<tr><td rowspan="7">20</td><td rowspan="7">Antenna Display</td><td>Bar Number</td><td>Power</td></tr>
<tr><td>5</td><td>-92 ± 2</td></tr>
<tr><td>5 -> 4</td><td>-93 ± 2</td></tr>
<tr><td>4 -> 2</td><td>-101± 2</td></tr>
<tr><td>2 -> 1</td><td>-104 ± 2</td></tr>
<tr><td>1 -> 0</td><td>-106 ± 2</td></tr>
<tr><td></td><td></td></tr>
<tr><td rowspan="5">21</td><td rowspan="5">Battery Indicator</td><td>Battery Bar Number</td><td>Voltage</td></tr>
<tr><td>3</td><td>> 3.75± 0.05 V</td></tr>
<tr><td>3 -> 2</td><td>3.75 ± 0.05 V</td></tr>
<tr><td>2 -> 1</td><td>3.67 ± 0.05 V</td></tr>
<tr><td>1 -> 0</td><td>3.6 ± 0.05 V</td></tr>
<tr><td rowspan="2">22</td><td rowspan="2">Low Voltage Warning
(Blinking Bar)</td><td colspan="2">Once per 1 minute. (Receiver)</td></tr>
<tr><td colspan="2">Once per 3 minutes. (Speaker)</td></tr>
<tr><td>23</td><td>Forced shut down
Voltage</td><td colspan="2">3.3 ± 0.05V</td></tr>
<tr><td>24</td><td>Battery Type</td><td colspan="2">Lithium-Ion Battery
Standard Voltage = 3.7 V
Battery full charge voltage = 4.2 V
Capacity: 950mAh</td></tr>
<tr><td>25</td><td>Travel Charger</td><td colspan="2">Switching-mode charger
Input: 100 ~ 240V, 50/60 Hz
Output: 4.8 V, 400 mA</td></tr>
</table>

3. TECHNICAL BRIEF

3.1 Digital Main Processor

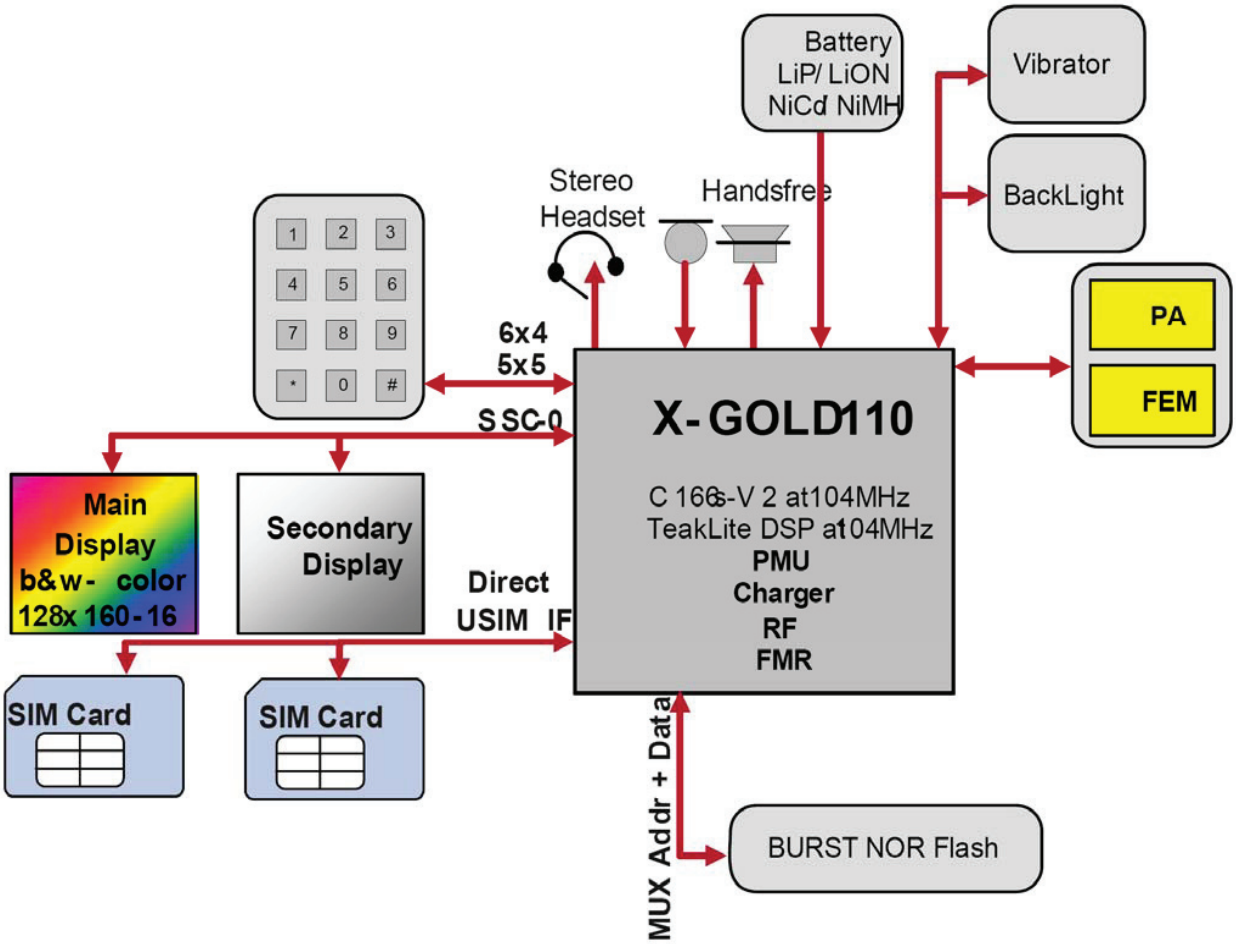


Figure. 3.1.1 X-Gold tm 110 Hardware Block Diagram

3.1.1 General

Technology:
– SoC, Monolithic, 65 nm CMOS
• Package:
– WFWLB, 8x8x0.8 mm
– 0.5 mm pitch
– 217 balls

3.1.2 RF Transceiver

• Dual-band direct conversion receiver
• Tri/Quad-band possible with external circuitry
• Fully integrated digital controlled X0
• Additional buffer for 2 external system clocks
• Fully digital RF-Synthesizer incl. ΣΔ-Transmitter

3.1.3 Baseband

• High performance fixed-point TEAKlite DSP
• C166S-V2 high performance microcontroller with a 16KB Instruction Cache and a Data cache Buffer.
• FM Stereo Radio Receiver with RDS
• There are several Interfaces:
– I2S interface for DAI connections (for Tape Approval) and external Audio component connection.
– High Speed SSC Interface for connection of companion chips (like Serial SD Cards)
– High Speed SSC Interface dedicated to Display control
– USIM Interface with support of Protocol T=1 and Dual USIM support.
– Keypad Interface (6x4 or 5x5 keys)
– External Memory Controller (EBU) for external RAM/NOR FLASH/Busrt Flash/NAND Flash/Serial Flash
(SPI/SQI) and Parallel Display connection
– Asynchronous serial interface.
– Asynchronous serial interface for WLAN/BT/GPS control (incl. IrDA support capability) .
– JTAG Interface, OCDS, Multi-Core Debug and Real Time Trace facilities.
– Black & white and 128x160 - 16bit color displays are supported
– PWM source to drive vibrator
– Keypad and display backlight supported.
– HASH Unit support for hashing.

Crystal Oscillator

• Fully digital controlled crystal oscillator core with a highly linear tuning characteristic

Mixed Signal and Power Management Unit

• Embedded stepdown converter (1.8V)
• DC/DC boost for voltages up to 15 V for driving White or Blue LEDs
• 8-Ω loud speaker driver (700 mW)
• 16-Ω earpiece driver
• 32-Ω headset driver
• Measurement interfaces (PA temperature, battery voltage, battery temperature, and ambient temperature)
• Accessory Detection
• PCB ID detection as part of measurement interface.
• Differential microphone input
• System start up circuitry
• Charger circuitry for NiCd, NiMh and LiIon cells with integrated Control Current/Voltage Charging.
• Integrated regulators for direct connection to battery.

C166S-V2 Buses

The C166S-V2 is connected to four buses:
1. IMB (Internal Program) bus (64b - 0 cycle instruction bus))
2. DPMI (Data-Program) Bus (16b - 0 cycle data bus)
3. X-Bus (16b - 3 cycle peripheral bus)
4. PD-Bus (16b 0 cycle peripheral bus)

Bus Interconnections

The interconnection between the X-Bus and the TEAKlite Bus uses:
• Multicore Synchronization
• Shared Memory.

3.1.4 FM Radio

• Integrated FM radio
– FM Stereo RDS Receiver
– Sensitivity 2 μV EMF
– Support for US & EU bands
– Stereo recording

3.1.5 Display

• Type
– 128*128, QQVGA, 65k color (parallel)
• Interface
– Parallel 8/9bit MIPI-DBI Type B
– Interf. voltage at 1.8V or 2.8V
• gRacr - Display Controller (Hardware)
– 30 fps Display update without DMA (up to 60 fps) (full or partial)
– Video post processing Scaling, Rotation (90° steps), Mirroring
– Overlay with alpha blending
– Color conversion YUV -> RGB
– 2D vector graphics (Lines, filled rectangles, Bit block transfer (e.g. sprites, scrolling, antialiased bitmap fonts)

3.2 Power Management

A mobile platform requires power supplies for different functions. These power supplies are generated in the integrated power management Unit (PMU). The PMU is designed to deliver the power for a typical standard phone.

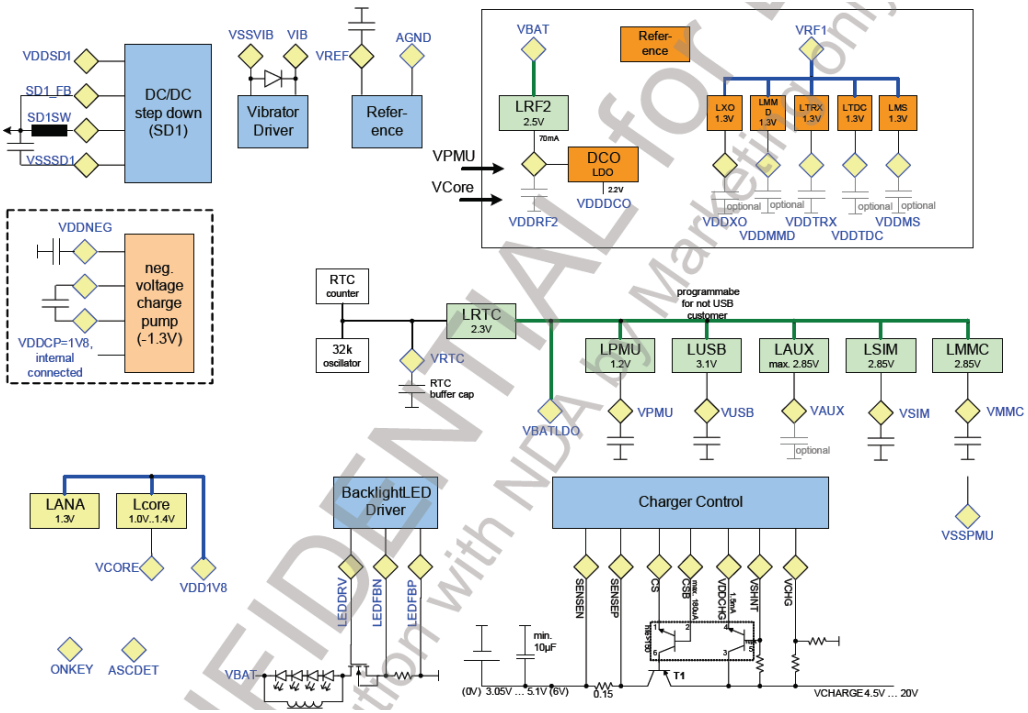


Figure. 3-2-1 Block Figure of the PMU Modules X-Gold tm 110

- **DC/DC Step Down Converter for 1.8V (SD1)**

The DC/DC converter generates a 1.8 V supply rail. This voltage rail is used to supply main parts of the system, like the digital core of the chip (via LDO LCORE), parts of the mixed signal macro, parts of the RF macro and the external memory if a 1.8V memory is used.

▪ Linear voltage Regulators (low dropout) LDOs

The LDOs are used to generate the supply for the different supply domains not directly supplied out of the DC/DC converter.

▪ LCORE

The LCORE LDO provides the VCORE supply used for most of the digital parts of the chip

▪ LPMU

The LPMU provides VPMU sued for the PMU supply, e.g. for the startup state machine and analog parts like ADC, sense amplifier etc.

▪ LAUX

The LAUX generates VAUX. It is a general purpose LDO and can be used for different functions depending on the phone application, e.g. for the display or Camera.

▪ LSIM

The LSIM LDO generates the VSIM supply for the SIM card and interface. It is designed to supply Standard SIM cards.

▪ Other LDOs

The RF module has implemented several LDO's for different RF Power domain.
The mixed signal module has some LDO's for the audio driver and microphone supply.

Supply Domain LDO Name	Voltage	Max. Current	Output Cap	Input Domain	Comment
VBAT	0 ... 6.0 V				Operating range is 3.05 V ... 5.5 V, system emergency switch off voltage is about 2.8 V
VDD1V8	1.8 V	450 mA	22 µF optional 10 µF	VBAT	This voltage is generated by the DC/DC converter with 3.3 µH inductor, (10 µF output cap is preferred but needs to be checked) The voltage is used for: Memory supply, and via LDOs for digital core supply, mixed signal supply and RF supply.
LCORE	1.2 V	100 mA	2x100 nF	VDD1V8	Assumption: C166 core clock 104 MHz, DSP clock 104 MHz
LANA	1.3 V	10 mA	No	VDD1V8	No ball
LRTC	2.3 V	2 mA	>=100 nF	VBAT	This supply is only used for the HPBG, the 32.768 kHz oscillator and the real-time clock counter required during the sleep- and low-power mode.
LPMU	1.3 V	15 mA	100 nF	VBAT	Supply for the digital part of the PMU including digital control of DC/DC converter. This voltage is also used for the N-DEMOS driver of DC/DC converter and the class-D amplifier and the core PLL.
LAUX	1.5 V ... 2.85 V	150 mA	>=470 nF	VBAT	General purpose LDO for e.g. Display, Bluetooth, Camera etc. Programmable output voltages are (1.5 V, 1.8 V, 2.5 V, 2.85 V)
LSIM	1.8 V / 2.85 V	30 mA	>=100 nF	VBAT	LDO dedicated to the SIM-Card supply. It is chip internal connected to the SIM interface driver.
VDDNEG	-1.3 V	100 mA	100 nF	VDD1V8	Negative voltage for the bipolar headset audio driver. Generated by a charge pump.

Table. 3-2-1 Power supply Domains (without RF)

3.2.1 Power on and startup

▪ Analog startup Circuit

Because the POR circuit and the LPBG are directly connected to the battery, it is not possible to switch them off. If the battery voltage exceed the power on reset threshold (2.5V), the power on reset is released, the LPMU regulator and the LRTC voltage regulator are switched on. The LPMU regulator starts in its ultra-low power mode

The LPMU regulator generates a control signal (lpmu_OK) that enables the 50KHZ PMU oscillator. The output clock of the oscillator is checked with a fully coded counter. A counter overflow releases the reset (vpmu_rst_n) signal for the small PMU state-machine.

▪ Small first digital State-Machine

The small PMU state-machine is always connected to VPMU After starting from reset the small startup state machine enters the SYSTEM OFF state and only continuous the startup procedure if a switch on event like first connect, on-key, wake up or charge detect occurs.

▪ PMU-main State-Machine

The main PMU state-machine is always connected to VPMU also. The power up sequence driven by the PMU state-machine can be seen in Figure18. After enabling the reference (HPGB) and waiting for the settling time, the battery voltage is measured and compared with the power on threshold. If the battery voltage is high enough, the SD1 DC/DC converter and the LCORE LDO are started. A timer ensures that the supply voltage will be stable before the DCXO is enabled. The DCXO settling time is ensured using a fixed timer. After an overflow of this timer, the reset is released for the rest of the system. The PMU state machine remains in this System-ON state until the system is switched into the OFF state. For example the system sleep mode is completely configured by software(for example switching off the LDO's, switching of the DCXO etc.) and controlled by the VCXO_enable signal. The reason for the startup is stored in the ResetSourceRead register.

▪ Battery Measurement

The ADC and the oscillator for the ADC needs the VDD_ADC supply voltage from the LADC LDO. LADC uses either the charger voltage VDD_CHARGE or VDDRTC as input voltage. The input voltage is selected automatically by a bulk switch circuit. LADC, the ADC and the oscillator are enabled on request for every battery measurement if the charger unit is not running. This is handled by an ADC control block in one of the state-machines. If the charger unit is running the ADC is controlled by the charger state-machine

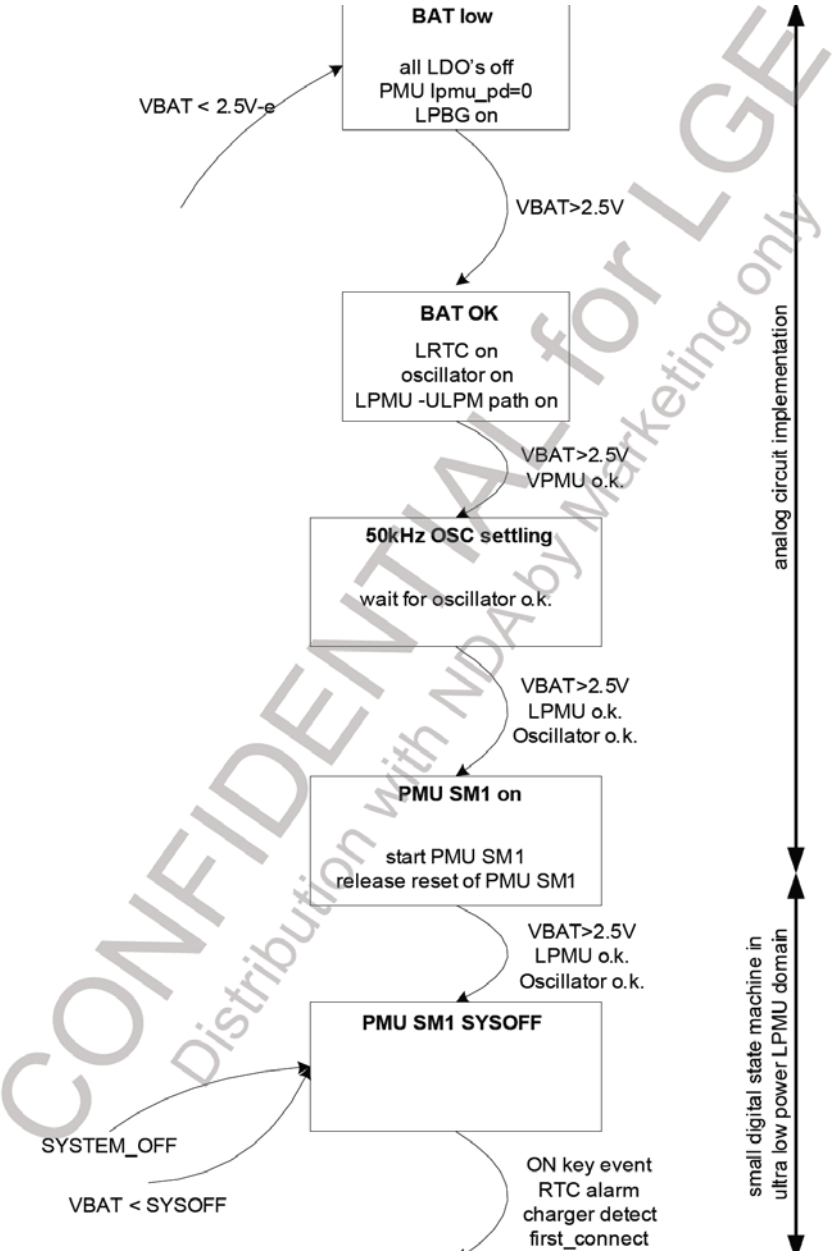


Figure.3.2.1 First Part of the State Machine, Running in Different Power Domains than the Second Part

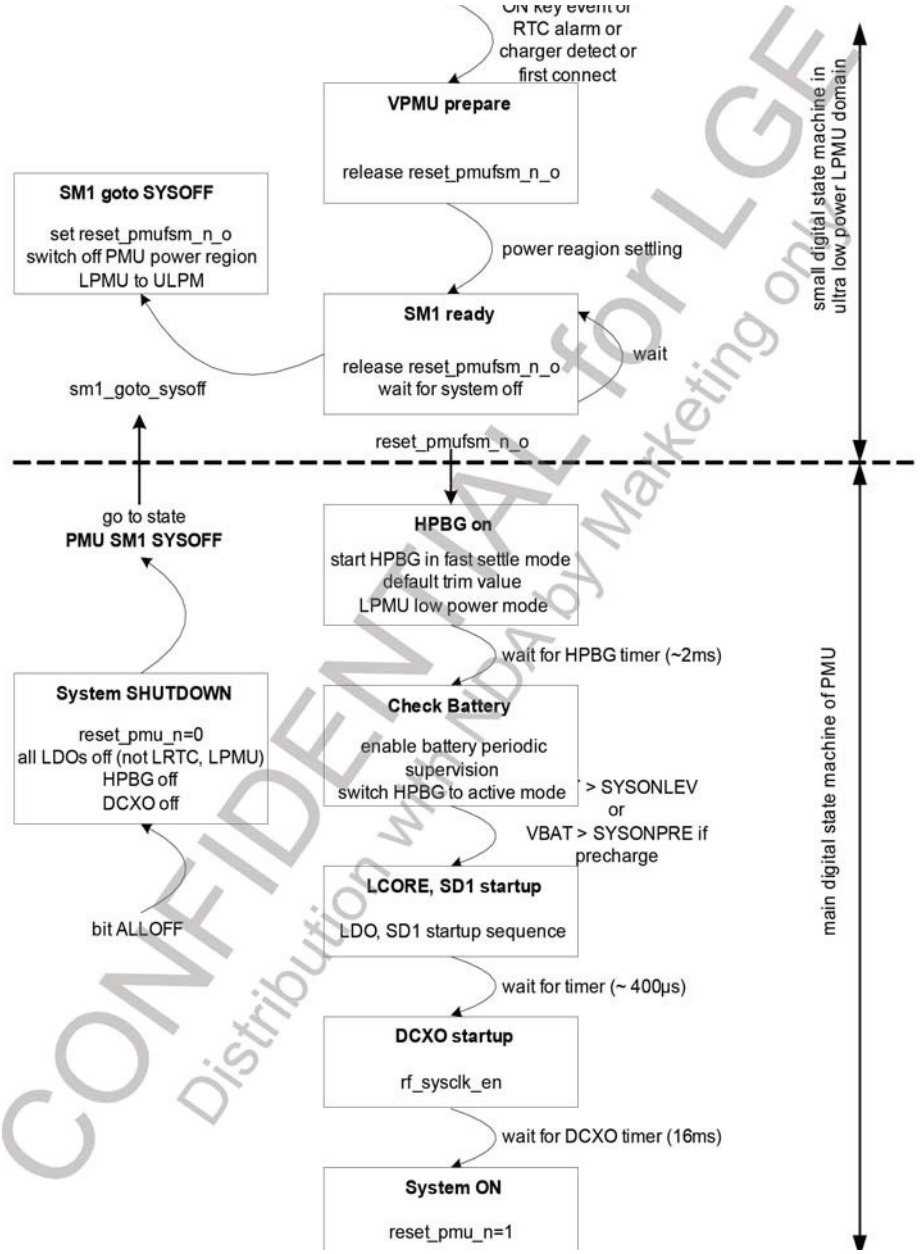


Figure 3.2.2 Second (Main) Part of the Startup State Machine in the VPMU Domain

3.2.2 Switching on due to first connect

If the battery voltage is connected the first time, that means the system enters the first time the SYSOFF state, this is stored in a first connect flag. If the first connect flag is set, the system will start immediately and not wait for any other system on event in the SYSOFF state.

3.2.3 Switching on due to on-Key event

The on key is connected to the ONKEY pad. The ESD protection and the input structure of this pad are connected to VRTC. If the ONKEY pad is forced to VRTC by an external key or similar circuit, the system starts. The ONKEY is sampled with the PMU clock. It has to be sampled four times high before a valid on event is generated. The status of the ON key can be read in the PMU registers, so it can be used as a functional key during phone operation also

3.2.4 Switching on due to RTC alarm

The real time clock can generate a wakeup signal called RTC alarm. This signal is sampled from the state-machine and after successfully detecting a high, the system is switched on.

3.2.5 Switching on due to charging

When a battery with a voltage below the SSONLEV level is inserted, the state machine will not start the system. As long as the battery voltage stays lover than SYSONLEV the system will stay off. The only possibility to start up the system is due to an external charger.

If an external charger is connected and detected and the battery is charged above the SYSONPRE voltage level the system will start up.

The PMU main state machine waits in the Check battery state until the battery voltage condition is fulfilled. The charger state machine provides the necessary pre-charge indication signal. This pre-charge signal is denounced in a small counter to have a stable signal. This is important, especially in half/full-wave charging where the charger detection is switching between charger detected/not detected according the AC supply frequency. reasons

For details on pre-charging see the charger chapter. The charger is controlled by an independent state machine. The pre-charge signal is used to trigger the pre-charge signal is used to trigger the pre-charge functionality. The charger state machine fully control the pre-charge, the PMU-state machine now changes to state HPBG on state and the system starts. This state change is indicated to the charger state-machine to enable the charger watchdog for safety

3.2.6 Power Supply Start-up sequence

In order to avoid an excessive drop on the battery voltage caused by in-rush current during system power-on, possibly leading to system instability and “hick-ups” a staggered turn-on approach for the regulators is implemented. The regulators are turned on in a well defined sequence, thus spreading the in-rush current transients over time.

The IO’s of X-GOLD TM 213 are isolated in OFF mode (core supply is off). The isolation signal is controlled by the PMU state machine. This ensures that the PADs are in a well defined state during core supply settling. This allows to power up the LCORE core regulator and wait for the core to reach reset state before powering up the I/O supply regulators.

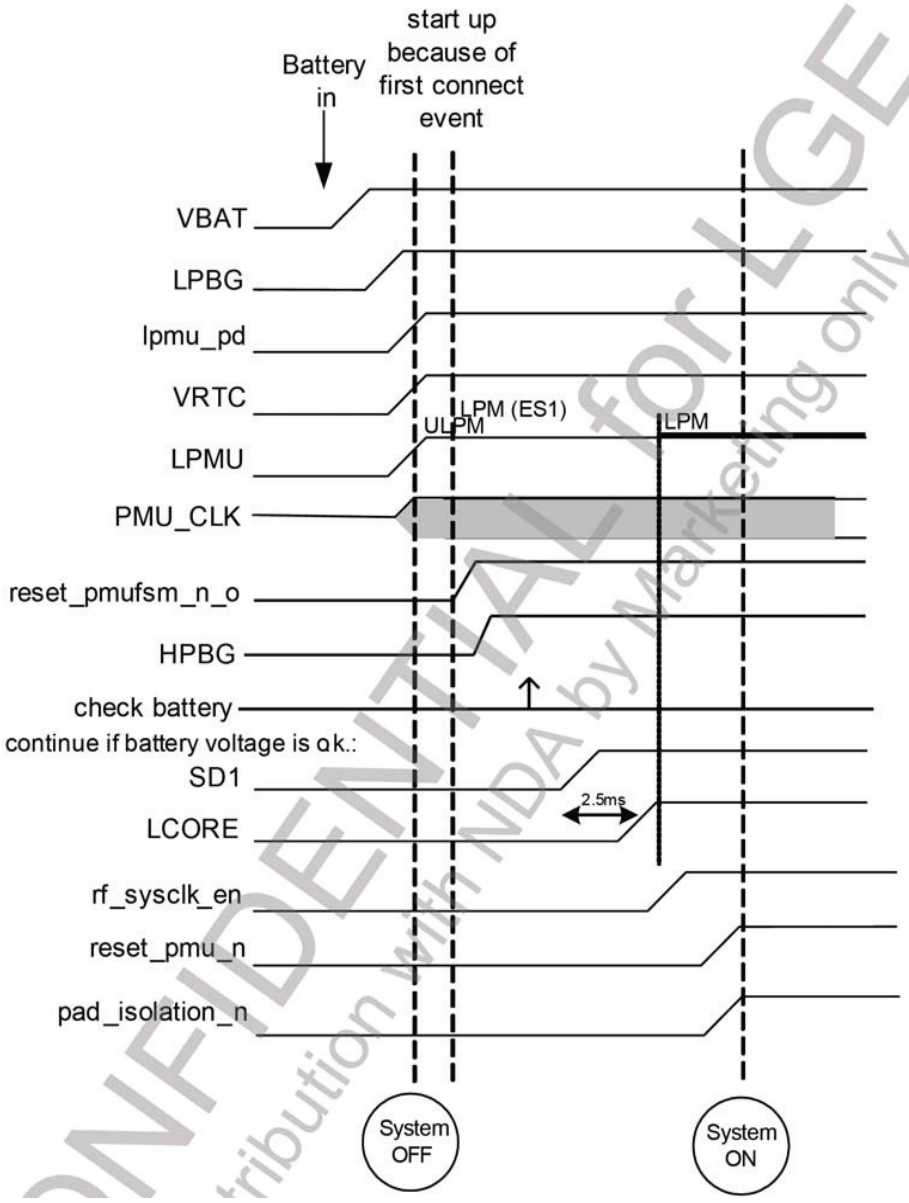


Figure 3.2.3 Start Up Sequence (triggered by First Connect Event)

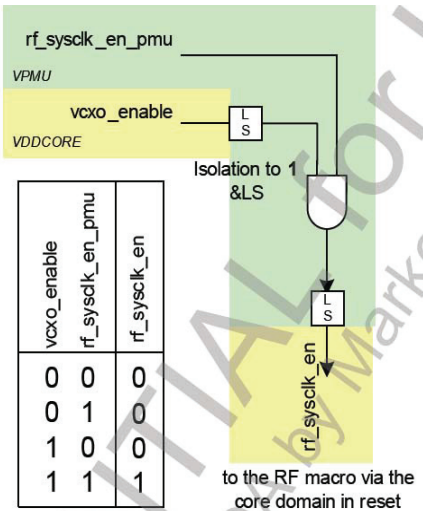


Figure 3.2.4 How sysclock Enable is Routed in the PMU

3.2.7 Sysclock Switching

The PMU controls the rf_sysclk_en signal of the DCXO in the RF macro. During startup the PMU enables the DCXO. After the system is running the DCXO is controlled by the SCU of the baseband by using the vcxo_enable signal. This is handled by a dedicated logic in the PMU, see **Figure 21**. As long as rf_sysclk_en_pmu, the output of the PMU state-machine is high, vcxo_enable controls the rf_sysclk_en signal to the RF. If rf_sysclk_en_pmu is low, the DXCO is switched off, independent from vcxo_enable.

3.2.8 Undervoltage Shutdown

In active mode the PMU periodically measures the battery voltage using the ADC from the charger unit. If the battery is measured to be below the programmable shut-down level (called SYSOFF), the system changes to OFF mode. This is done via the SHUTDOWN state of the PMU state machine. (see chapter switch OFF)

3.2.9 Silent Reset

WDT-reset and software-reset shall happen silently to ending customer: SIM card and interfaces have to stay powered and not reset by neither WDT-reset or C166s SRST instruction. To allow this, some LDO settings and some registers (as e.g. USIM_pad control register) are reset only by system-reset (HW-reset or power-on reset)

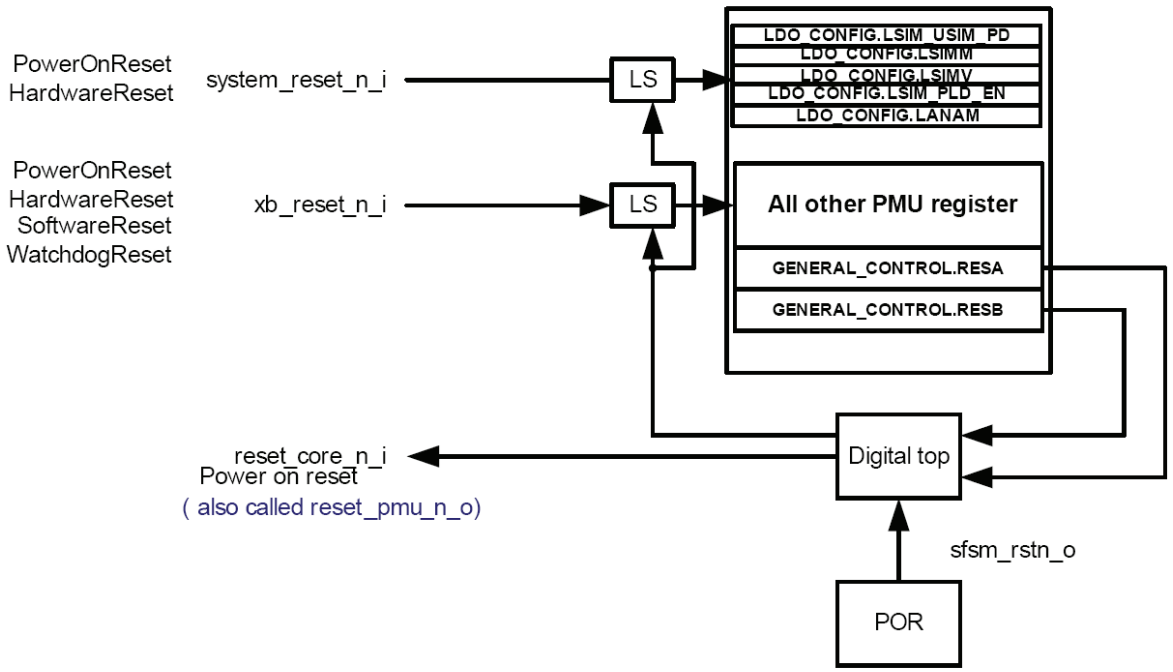


Figure 3.2.5 PMU Reset

3.2.10 PMU Clock

During the first startup (for example plugging in a battery) a PMU internal oscillator is used for generation of the PMU clock (pmu_clock). The frequency is slightly above 32 kHz (typ. 50 kHz) to be out of the audio band also for worst case devices. After first startup the software shall enable the 32 kHz crystal oscillator. It is not possible to use the 32 kHz oscillator during first startup, because the settling time of the oscillator can be quite long. After the 32 kHz oscillator is running and settled the software shall switch the PMU clock to the 32 kHz clock and disable the internal PMU oscillator for power saving reasons. The 32 kHz oscillator shall never be disabled after the PMU clock has been switched. The ADC in the charger unit has it's own oscillator generating a frequency of about 10 MHz. This oscillator is running during charging and during battery measurements triggered by the PMU. It is off otherwise.

3.2.11 System Sleep Mode

The sleep mode is controlled by using the VCXO_enable signal (dcxo_en_i) and gsm_sleep_i. These signals are used to deactivate the HPBG and setting LDO LPMU in the ultra-low-power mode. In addition the DCXO is switched off by the VCXO_enable signal. The VCXO_enable signal is also used to switch some LDO's (software configured) to sleep and/or off mode or to change the output voltages of said LDO's. The state of the main PMU state machine is not changed due to VCXO_enable.

3.2.12 DC/DC Pre-Load Register Handling

The DC/DC converter works in different modes. If the mode is switched from PFM to PWM the pulse-width of the DC/DC converter depends on the current battery voltage (and on the output voltage). The PMU state-machine knows the battery voltage because of the battery supervision function. Depending on this value it selects a startup pulse-width for the DC/DC converter out of a register table. (4-values)

3.2.13 Power Down Sequence

Setting bit OFF in the GeneralControl register switches the system into OFF mode. After the turn off event, the state-machine switches to the SHUTDOWN state. The reset_pmu_n_o signal changes to low, the I/O pads are isolated using the padisolation_n signal, the LCORE LDO and the SD1 DC/DC converter are switched off, the LPMU LDO is switched to ultra-low power mode, the DCXO is turned off and the bandgap buffer is disabled. Before switching OFF the software shall have enabled the 32 kHz oscillator and has switched the PMU clock to the 32 kHz clock to archive the target OFF current

3.3 FEM with integrated Power Amplifier Module (SKY77542/SKY77543, U301)

3.3.1 Internal Block Diagram

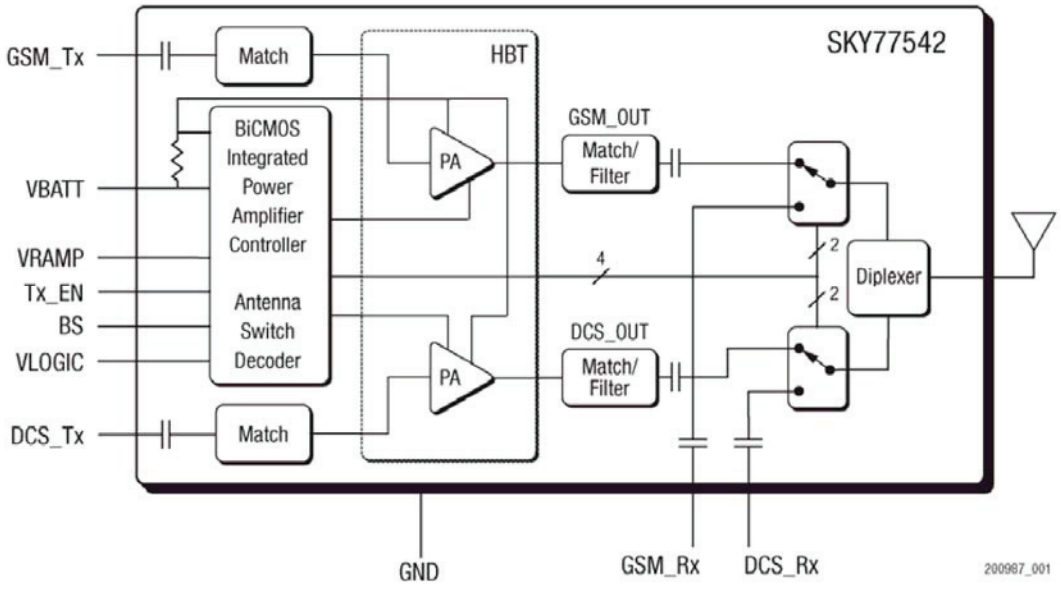


Figure. 3.3.1 SKY77542 FUNCTIONAL BLOCK DIAGRAM

3.3.2 General Description

The SKY77542 is a transmit and receive front-end module (FEM) with Integrated Power Amplifier Control (iPAC™) for dual-band cellular handsets comprising GSM900 and DCS1800 operation.Designed in a low profile, compact form factor, the SKY77542 offers a complete Transmit VCO-to-Antenna and Antenna-to-Receive SAW filter solution. The FEM also supports Class 12 General Packet Radio Service (GPRS) multi-slot operation.
The module consists of a GSM900 PA block and a DCS1800 PA block, impedance-matching circuitry for 50 Ω input and output impedances, Tx harmonics filtering, high linearity and low insertion loss PHEMT RF switches, diplexer and a Power Amplifier Control (PAC) block with internal current sense resistor. A custom BiCMOS integrated circuit provides the internal PAC function and decoder circuitry to control the RF switches. The two Heterojunction Bipolar Transistor (HBT) PA blocks are fabricated onto a single Gallium Arsenide (GaAs) die. One PA block supports the GSM900 band and the other PA block supports the DCS1800 band. Both PA blocks share common power supply pads to distribute current.

The output of each PA block and the outputs to the two receive pads are connected to the antenna pad through PHEMT RF switches and a diplexer. The GaAs die, PHEMT die, Silicon (Si) die and passive components are mounted on a multi-layer laminate substrate. The assembly is encapsulated with plastic over mold.

Mode	VLOGIC	Input Control Bits	
		Tx_EN	BS
STANDBY	0	X [1]	X [1]
GSM_Rx	1	0	0
DCS_Rx	1	0	1
GSM_Tx	1	1	0
DCS_Tx	1	1	1

[1] X = don't care

Figure 3.3.2 Band SW Logic Table

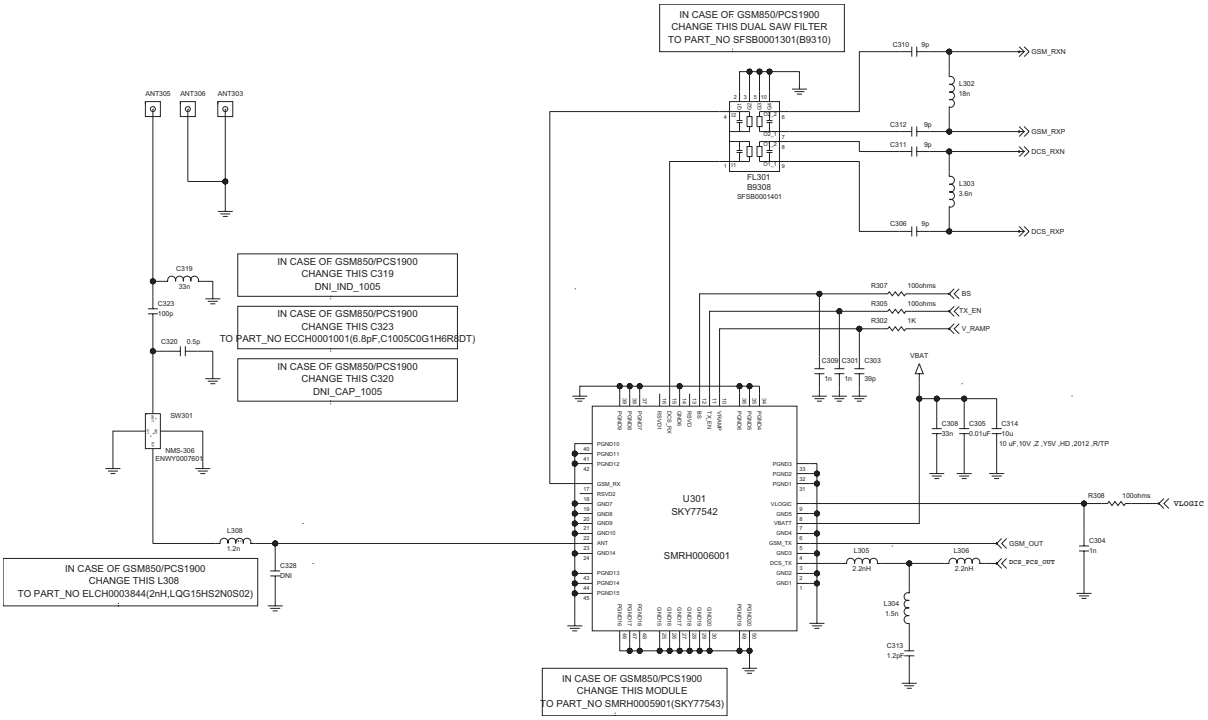


Figure 3.3.3 FEM CIRCUIT DIAGRAM

3.4 Crystal(26 MHz, X102)

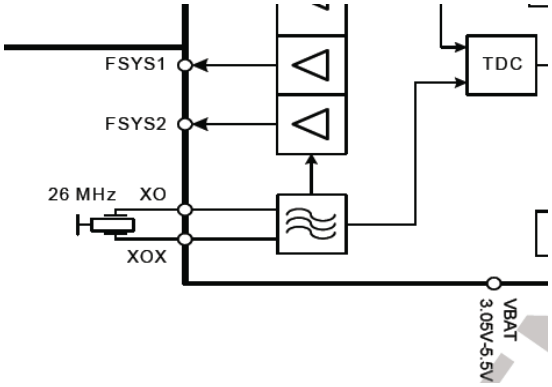


Figure. 3.4.1 Crystal Oscillator External Connection

The X-GOLDTM110 RF-Subsystem contains a fully integrated 26 MHz digitally controlled crystal oscillator,
designed for 8 pF crystals. The only external part of the oscillator is the crystal itself. Overall pulling range of the
DCXO is approximately ±55 ppm, controllable by a 13-bit tuning word DCXO_AFC[16:4].

The 26 MHz reference clock can also be applied to external components like Bluetooth or GPS, via the buffered output signal FSYS1.

3.5 RF Subsystem of PMB8810 (U101)

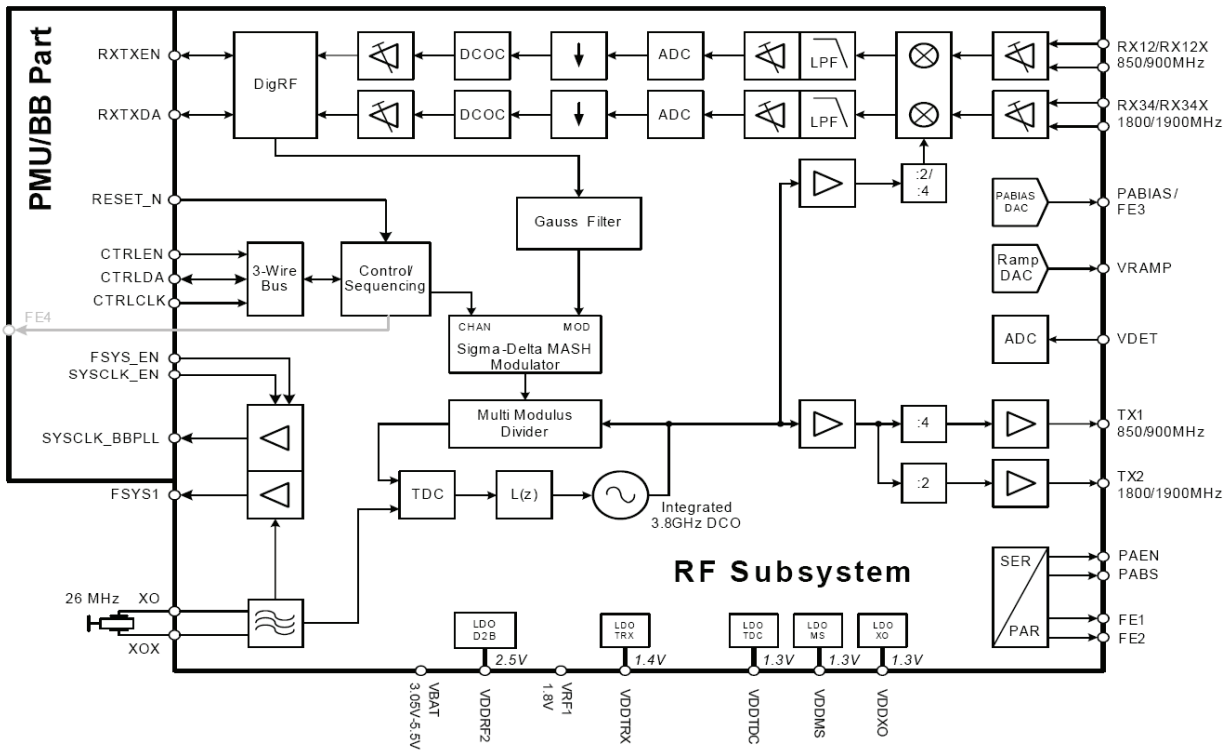


Figure. 3-5-1 Block DIAGRAM of RF Subsystem

3.5.1 GENERAL DESCRIPTION

The PMB8810 RF subsystem is designed for dual-band GSM voice and data applications (GPRS class 12). The syst can be configured to support one low band, GSM850 or EGSM900, and one high band, DCS1800 or PCS1900. A block diagram of the RF subsystem is given in Figure 3-4-1.

3.5.2 FUNCTIONAL DESCRIPTION

3.5.2.1 Receiver

The X-GOLDTM110 receiver is based on the Direct Conversion Receiver architecture (DCR) and can be configurec to support one low band, GSM850 or EGSM900, and one high band, DCS1800 or PCS1900. A fully differential receive path is chosen to suppress on-chip interference.
The analog section of the receiver contains two LNAs, quadrature mixer, low-pass filter, and a high resolution continuous-time delta-sigma analog-to-digital converter.

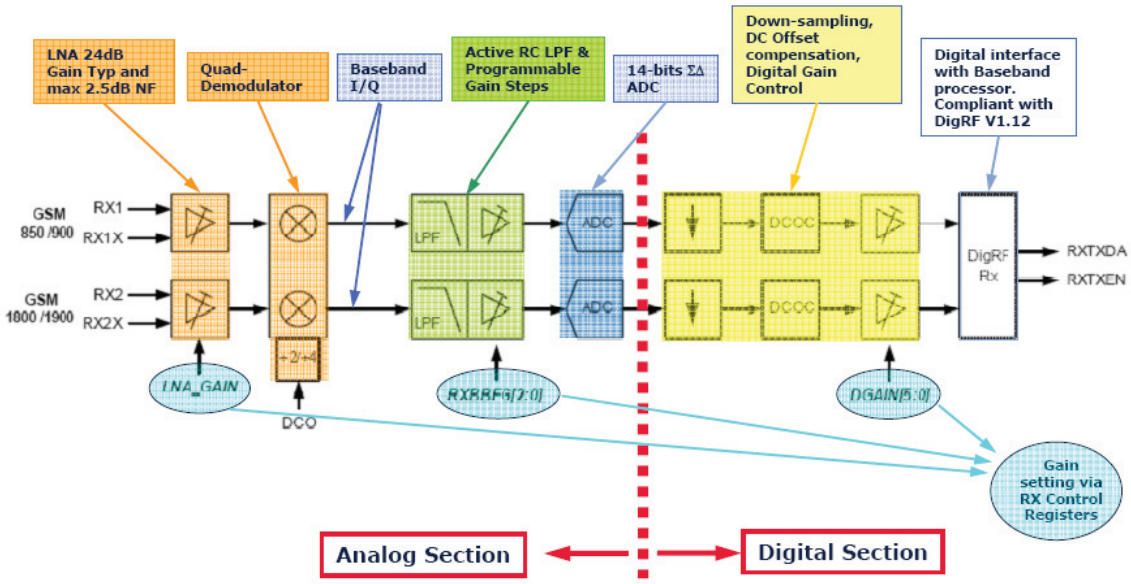


Figure. 3.5.2 RECEIVER CHAIN BLOCK DIAGRAM

3.5.2.2 Transmitter

The GMSK transmitter supports power class 4 for GSM850 or GSM900 as well as power class 1 for DCS1800 or PCS1900. The digital transmitter architecture is based on a fractional-N sigma-delta synthesizer for constant envelope GMSK modulation. This configuration allows a very low power design without any external components. Up- and down-ramping is performed via the ramping DAC connected to VRAMP.

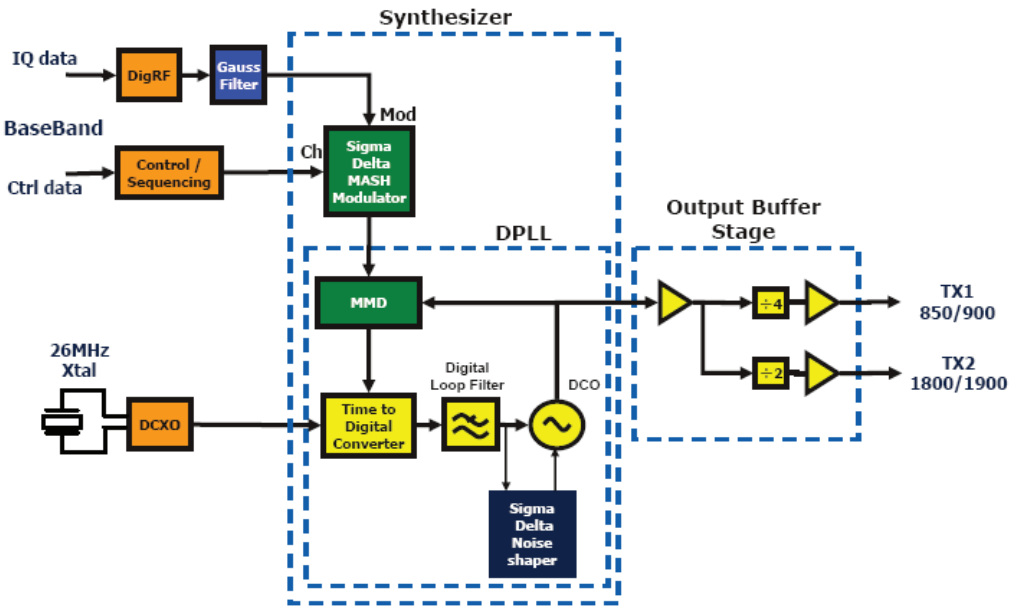


Figure. 3.5.3 TRANSMITTER CHAIN BLOCK DIAGRAM

3.5.2.3 RF synthesizer

The X-GOLDTM110 transceiver contains a fractional-N sigma-delta synthesizer for frequency synthesis in RX mode. In TX mode, the fractional-N sigma-delta synthesizer is used as a Sigma-delta modulation loop to process the phase/frequency signal. The 26 MHz reference signal is provided by the reference oscillator. This reference signal frequency serves as the comparison frequency for the phase detector and provides the digital circuitry with a clock signal.

3.5.2.4 Front-end/PA Control Interface

Two outputs (FE1, FE2) for direct control of antenna switch modules enable to select RX- and TX-mode as well as low- and high-band operation.
An extra band select signal PABS for the power amplifier is used, to support discrete PA and switching modules. Time accurate power dissipation of the PA is achieved by the control signal PAEN.
A minor set of power amplifiers require a bias voltage to enhance power efficiency. Support of this power amplifiers is achieved by the implemented bias DAC.

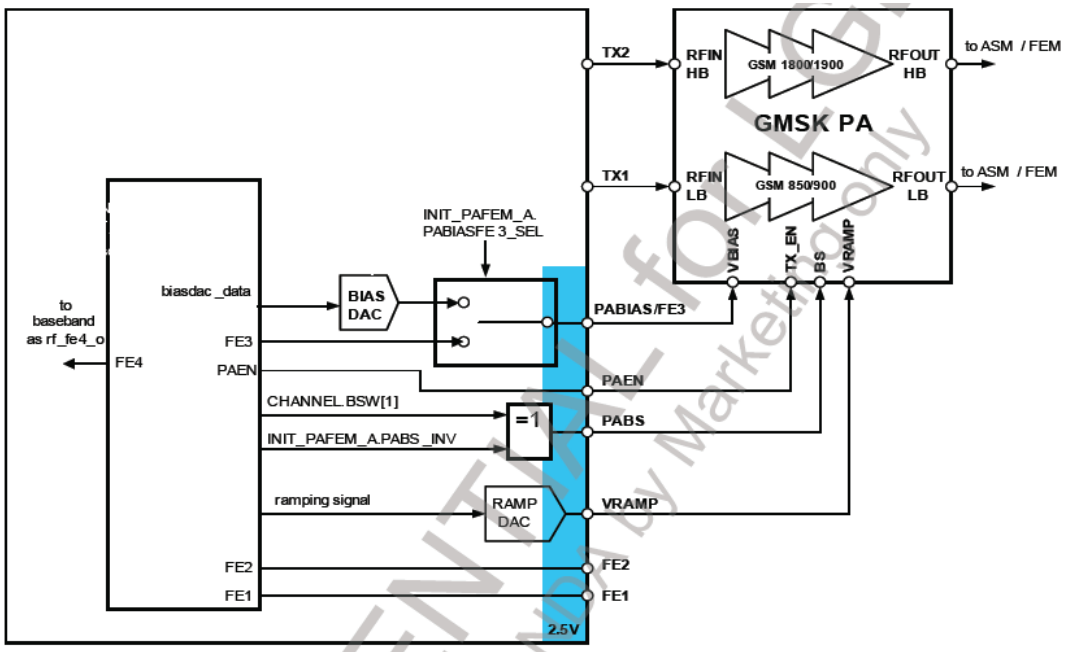


Figure. 3.5.4 PA AND FEM CONTROL BLOCK DIAGRAM

3.6 MEMORY(K5N3217ATA-AT80, U102)

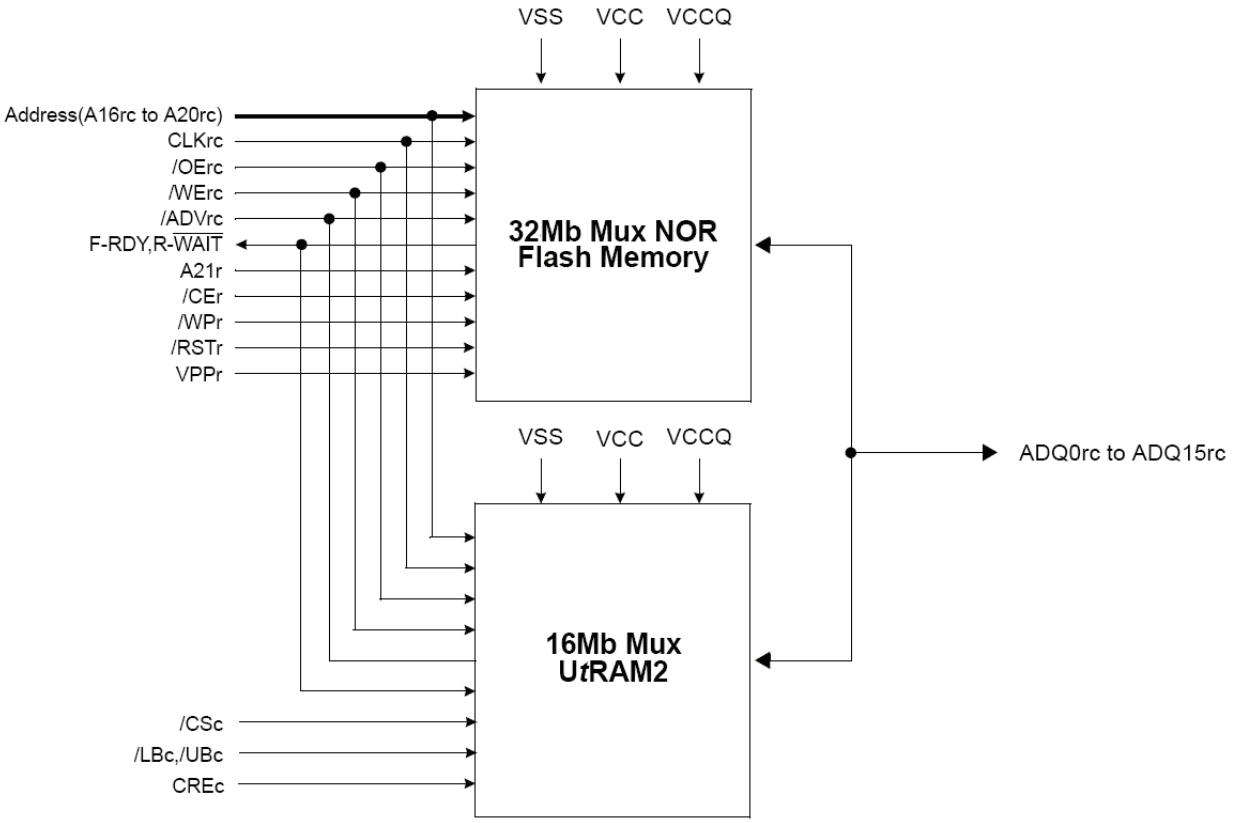


Figure. 3.6.1 MEMORY BLOCK DIAGRAM

The K5N3217ATA is a MultiChip Package Memory which combines 32Mbit MuxNOR Flash Memory and 16M bit MuxUtRAM2. The 32Mb NOR Flash featuring single 1.8V power supply is 32Mbit Synchronous Burst Multi Bank Flash Memory organized as 2Mx16. The memory architecture of the device is designed to divide its memory arrays into 71 blocks with independent hardware protection. This block architecture provides highly flexible erase and program capability. The 32Mb NOR Flash consists of sixteen banks. This device is capable of reading data from one bank while programming or erasing in the other bank. Regarding read access time, the device provides an 14.5ns burst access time and an 70ns initial access time at 54MHz. At 66MHz, the device provides an 11ns burst access time and 70ns initial access time. At 83MHz, the device provides an 9ns burst access time and 70ns initial access time.

At 108MHz, the device provides an 7ns burst access time and 70ns initial access time. The device performs a program operation in units of 16bits (Word) and an erase operation in units of a block. Single or multiple blocks can be erased. The block erase operation is completed within typically 0.7sec. The device requires 15mA as program/erase current in the extended temperature ranges.

SAMSUNG's UtRAM products are designed to meet the request from the customers who want to cope with the fast growing mobile applications that need high-speed random access memory. UtRAM is the solution for the mobile market with its low cost, high density and high performance feature. device is fabricated by SAMSUNG´s advanced CMOS technology using one transistor memory cell. The device supports the traditional SRAM like asynchronous operation (asynchronous read and asynchronous write), the NOR flash like synchronous operation (synchronous burst read and asynchronous write) and the fully synchronous operation (synchronous burst read and synchronous burst write). These operation modes are defined through the configuration register setting. It supports the special features for the standby power saving. Those are the PAR(Partial Array Refresh) mode, DPD(Deep Power Down) mode and internal TCSR(Temperature Compensated Self Refresh). It also supports variable and fixed latency, driver strength settings, Burst sequence (wrap or No-wrap) options and a device ID register (DIDR).
The K5N3217ATA is suitable for use in data memory of mobile communication system to reduce not only mount area but also power consumption.
This device is available in 52-ball FBGA Type.

3.7 SIM Card Interface

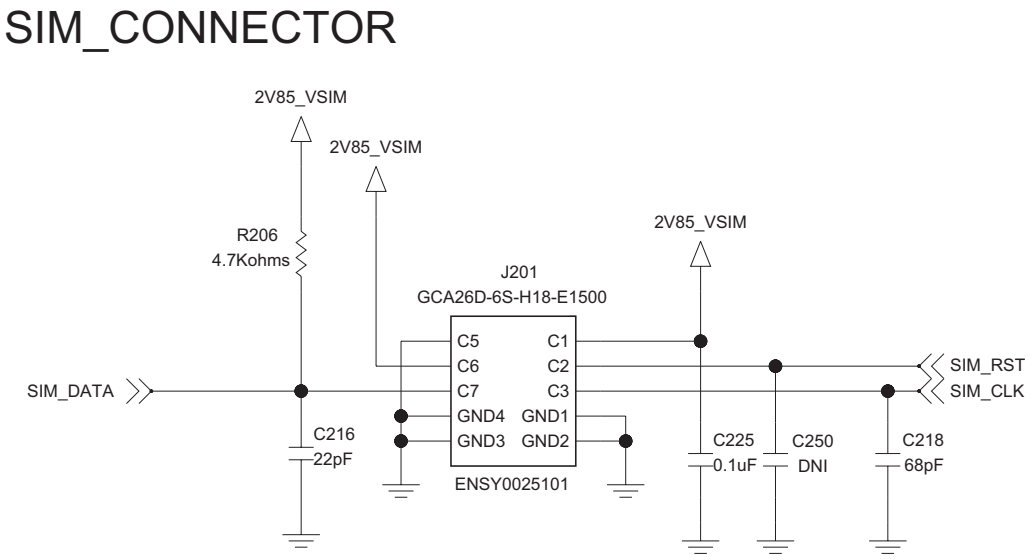


Figure 3.7.1. SIM CARD Interface

The Main Base Band Processor(XMM 110) provides SIM Interface Module.
The XMM2130 checks status Periodically During established call mode whether SIM card is inserted or not, but it doesn't check during deep sleep mode. In order to communicate with SIM card, 3 signals SIM_DATA, SIM_CLK, SIM_RST.
And This model supports 1.8/3V SIM Card.

Signal	Description
SIM_RST	This signal makes SIM card to HW default status.
SIM_CLK	This signal is transferred to SIM card.
SIM_DATA	This signal is interface datum.

3.8 LCD Interface

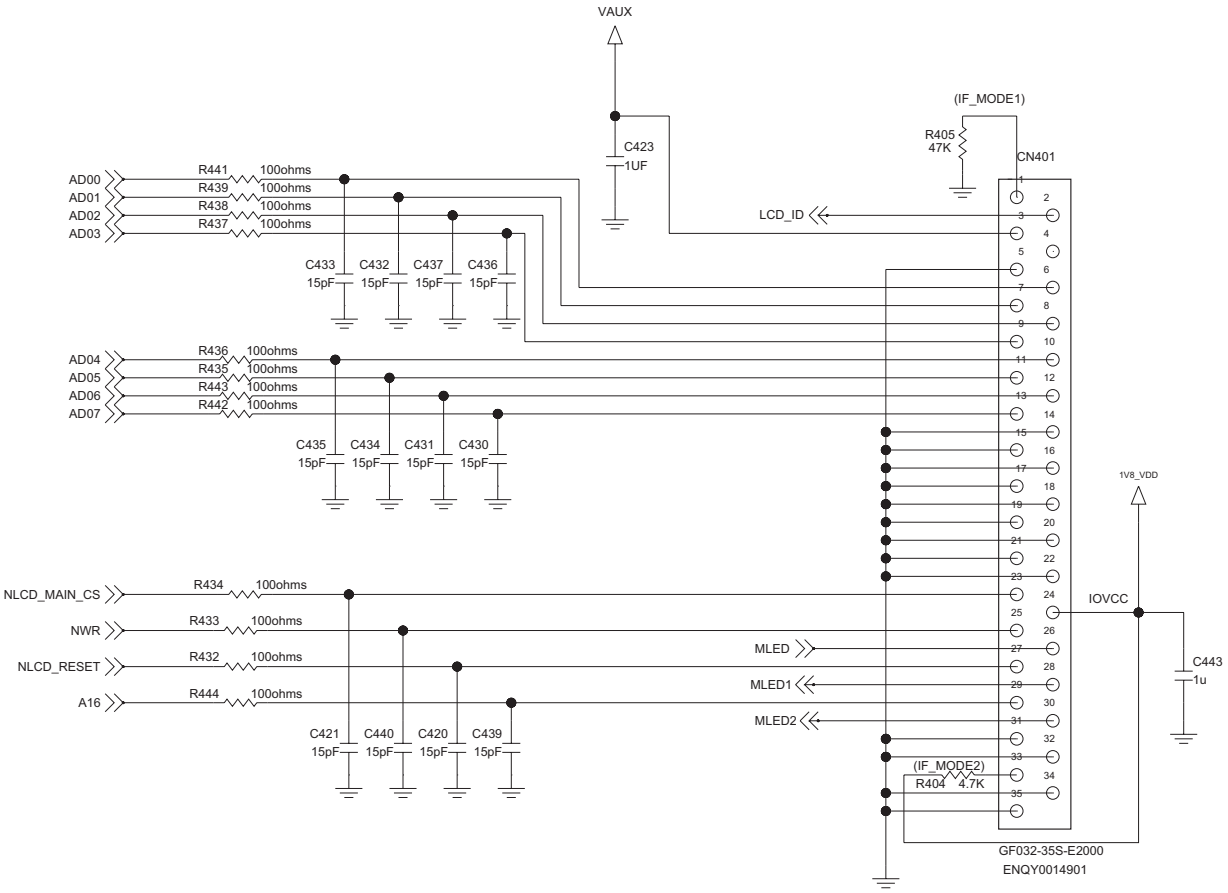


Figure 3.8.1. LCD Interface

The LG4515 is a 262,144-color one-chip controller driver LSI for a TFT liquid crystal display with resolution of 128 RGB x 160 dots, comprising a 384-channel source driver, RAM for graphics data of 128 RGB x 160 dots at maximum, a gate driver and a power supply circuit.
The LG4515 supports high-speed parallel interfaces to 8-, 9-, 16-, 18-bit ports and a function to write RAM data in high speed for transferring data efficiently and rewriting RAM graphics data in high speed.
The LG4515 can operate with low I/O interface power supply up to 1.65V, with an incorporated voltage follower circuit to generate voltage levels for driving an LCD. The LG4515 also supports a function to display in 8 colors and a standby mode, allowing for precise power control by software. These features make the LG4515 an ideal LCD driver for medium or small sized portable products supporting WWW browsers such as digital cellular phones or small PDAs, where long battery life is a major concern.

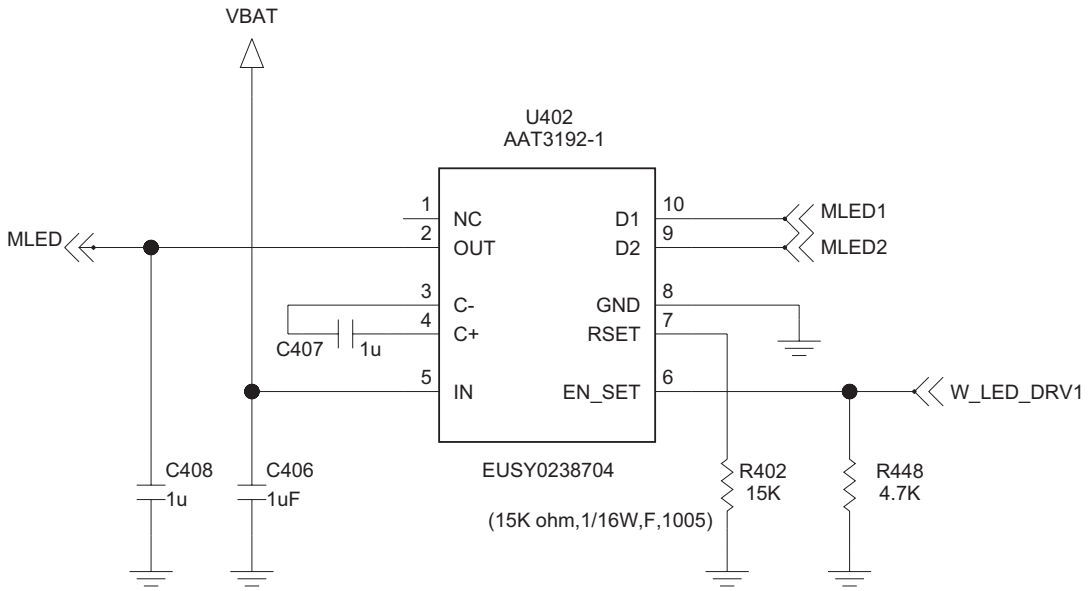


Figure 3.8.2. AAT3192 CIRCUIT DIAGRAM

The AAT3192 is a charge-pump based, current-sink white LED driver capable of driving one or two LEDs up to 30mA, each. It automatically switches between 1x mode and 2x mode to maintain the highest efficiency and optimal LED current accuracy and matching. The AAT3192 charge pump's 1x mode (bypass mode) has very low resistance allowing LED current regulation to be maintained with input supply voltage approaching the LED forward voltage. The AAT3192 is available in the 2x2mm, 10-lead SC70JW-10 package.

- Drives up to 2 LEDs at up to 30mA, each
- Automatic Switching Between 1x and 2x Modes
- 0.9MHz Switching Frequency
- Linear LED Output Current Control
- Single-wire, S2Cwire Interface
- AAT3192-1: 16-step
- ±10% LED Output Current Accuracy
- ±3% LED Output Current Matching
- Low-Current Shutdown Mode
- Built-in Thermal Protection

3.9 Battery Charger Interface

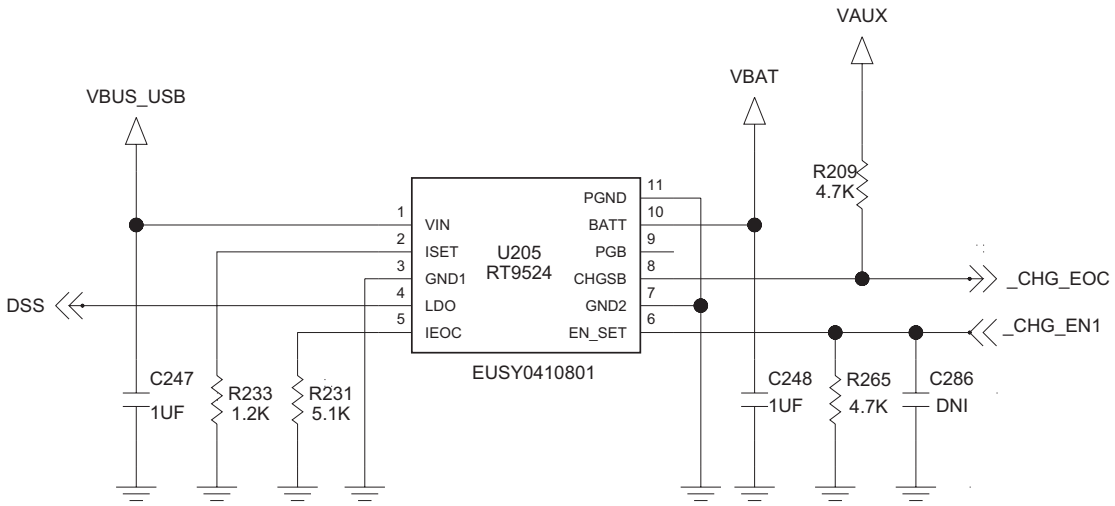


Figure 3.9.1 BATTERY CHARGER BLOCK

The BQ25040 is an intelligent, stand-alone constant current, constant-voltage (CCCV), thermally regulated dual input linear charger designed for charging a single-cell lithium-ion (Li+) battery.

The IC controls the charging sequence from the prequalification state through constant current fast charge, top-off charge, and full-charge indication.
Proprietary thermal-regulation circuitry limits the die temperature during fast charging or when the IC is exposed to high ambient temperatures, allowing maximum charging current without damaging the IC.

The BQ25040 accepts input supply range from -0.3V to 28V, but disables charging if the input voltages exceed +6.9V to protect against unqualified or faulty AC adapters cables. The IC operates over the extended temperature range (-40°C to +85°C)

3.10 Keypad Interface

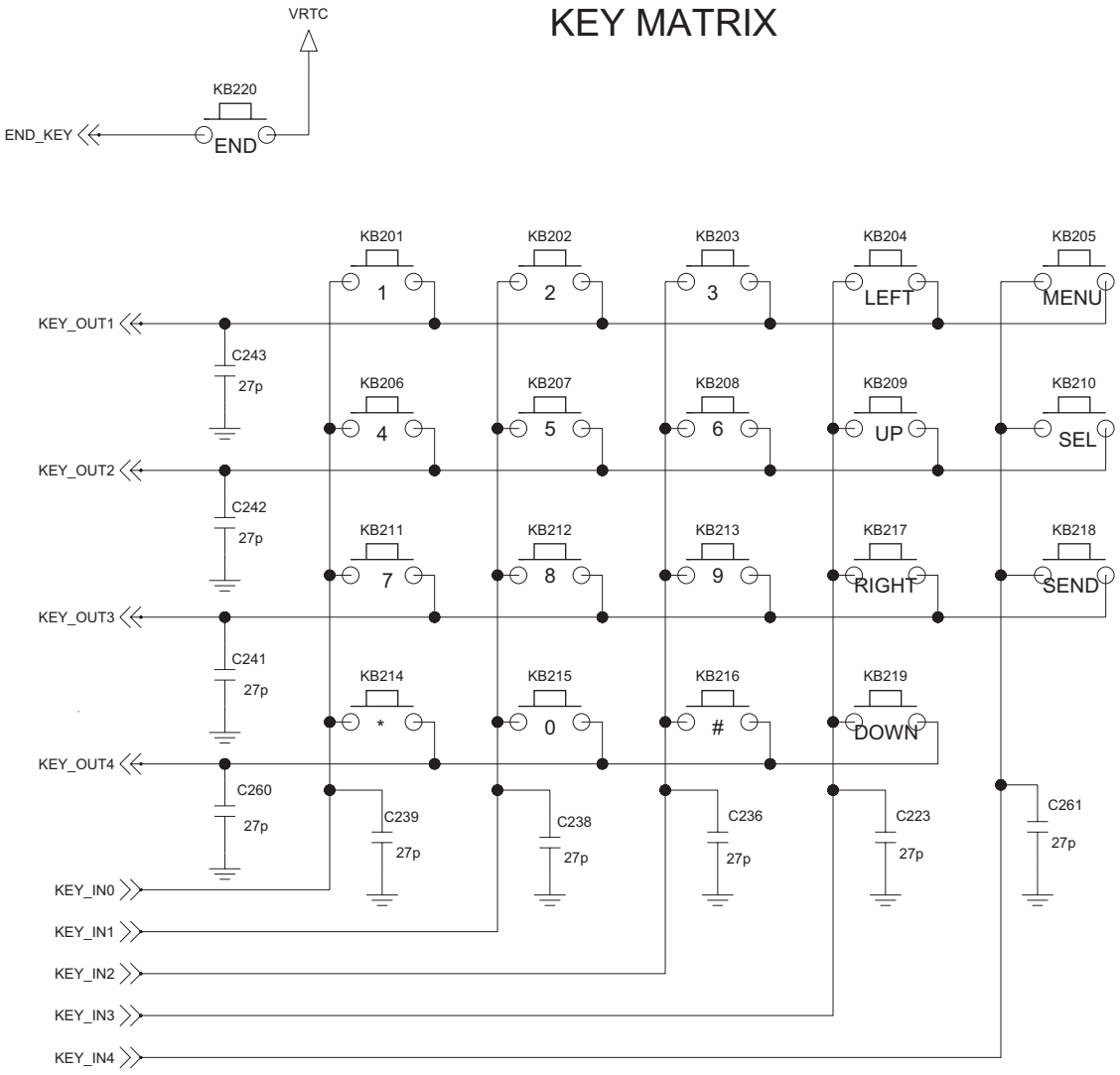


Figure 3.10.1 MAIN KEY STRUCTURE

The Keypad Interface is a peripheral controller, which can be used for scanning external keypad matrices with up to 8 rows and 8 columns (that is 64 standard keys). By adding an additional row of keys connected to ground the number of keys can be extended by up to 8 keys. This results in a maximum number of 72 keys to by identified by the Keypad Interface Controller.
The Keypad Scan Module reduces the number of interrupts and polling through the processor and therefore reduces the power consumption. The module is able to debounce and scan the external keypad matrix automatically without any software intervention. After debouncing it generates an interrupt. The interface controller contains information about the key (or key combination) that was pressed and how long it was pressed.

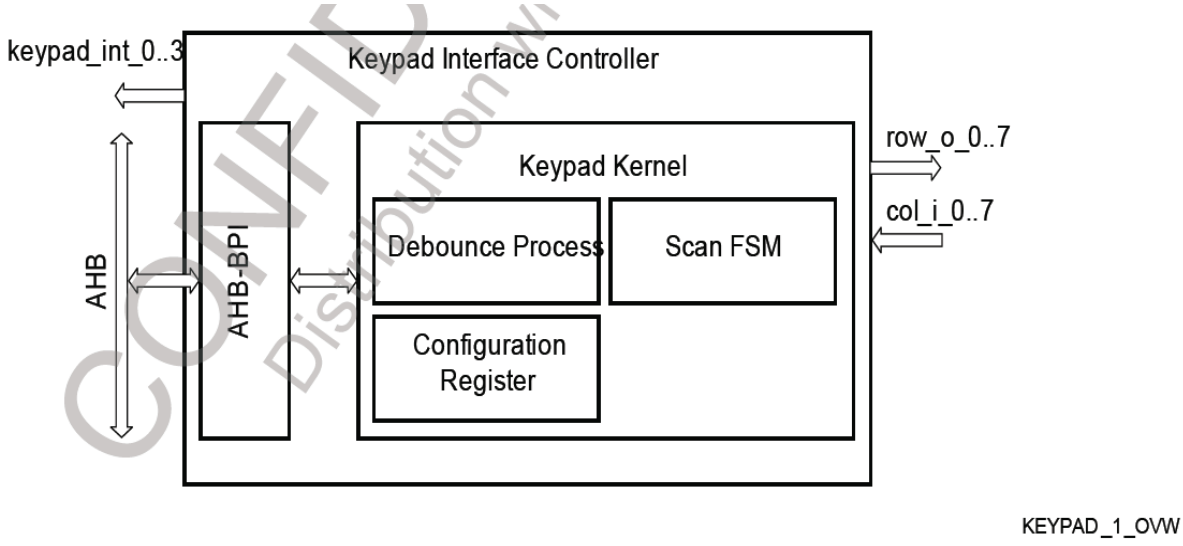


Figure 3.10.2 Block Diagram and System Integration of the KPD

3.11 Audio Front-End

3.11.1 Functional Overview

The audio front-end of X-GOLD™ 110 offers the digital and analog circuit blocks for both receive and transmit audio operation, from a mobile phone perspective (called audio-in and audio-out subsequently). It features a high-quality, stereo digital-to-analog path with amplifier stages for connecting acoustic transducers to X-GOLD™ 110. In audio-in path the supply voltage generation for electret microphones, a low-noise amplifier and analog to digital conversion are integrated in X-GOLD™ 110. A more detailed functional description will be given in the following sections.

The audio front-end itself can be considered to be organized in three sub-blocks:
• Interface to processor cores (TEAKLite® and - indirectly - ARM)
• Digital filters
• Analog part

The following figure shows an architecture overview of the Audio section.

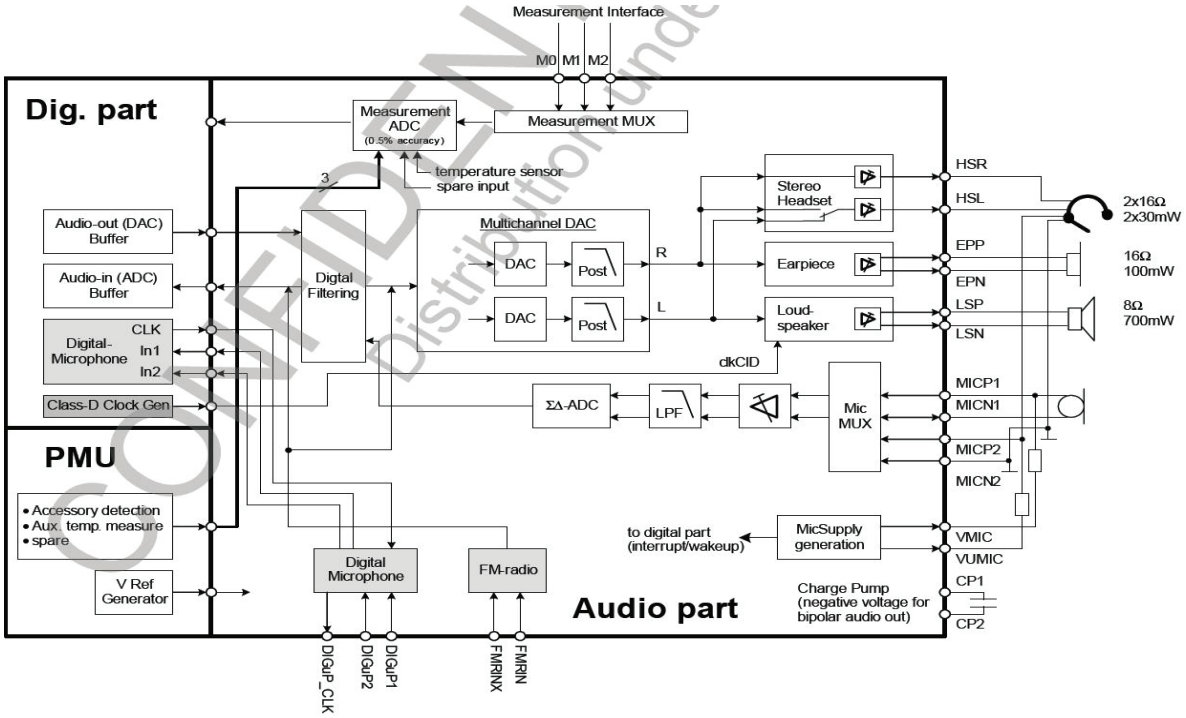


Figure 3.11.1 Audio Section Overview

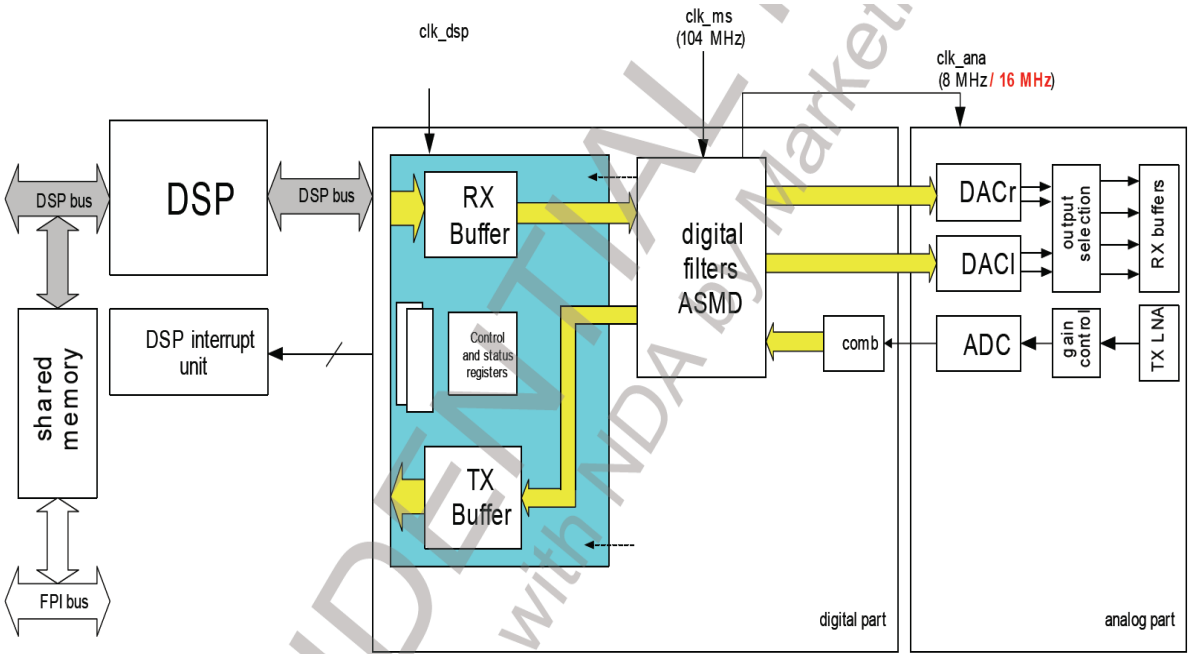


Figure 3.11.2 Overview of Clocking and Interfaces of Audio Front End

The audio front-end of X-GOLDTM110 has the following major operation modes:

• Power-down: All analog parts are in power down and all clocks of the digital part are switched off.

• Audio mode: Digital decimation/interpolation filters are connected to the interface buffers and the analog part is enabled.

These major modes can be modified by certain control register settings.

• Due to the new gain settings in the TX path, the maximum input voltage is limited to 0.8 Vpp.

• In both voiceband paths, the value range for voice samples is confined to 97.5%, i.e. to [-31948, 31947] or [8334H, 7CCBH] in X-GOLDTM110 .

• On the TX path, 83% "1"s on the VTPDM line correspond to a 16-bit value of 7CCBH and 17% "1"s correspond to 16-bit value of 8334H at the digital filter output. Thus the usable range is 66%. This range can be scaled to 100% by Firmware.

• The high-pass functions of the voiceband filters have to be implemented in firmware on TEAKLite®.

3.11.2 Digital Part

The digital part of the X-GOLDTM110 audio front-end comprises an interface to the TEAKLite® bus, interfaces to the interrupt units of TEAKLite®, digital interpolation filters for oversampling digital-to-analog conversion, digital decimation filters for analog-to-digital conversion and an interface to the analog part of the audio front-end.
For the digital microphone all the filtering is done in a dedicated hardware. The output sample stream is then fed in a duplicated ring buffer structure like the data from the analog microphone path (after A/D conversion and subsequent digital filtering).

▪ Interpolation Filter

The interpolation path of the X-GOLD™110 audio front-end increases the sampling rate of the audio samples to the rate of the digital-to-analog converter. Because the input sampling rates can vary between 8 kHz and 47.619 kHz the filter characteristic and oversampling ratio can be adjusted to the respective sampling rate. The requirements for the interpolation filters depend on the sampling rate, because a sufficient out-of-band discrimination in the audio frequency band (20 Hz,...,20 kHz) has to be ensured.

▪ Decimation Filter

The digital decimation filter on X-GOLD™110 has two operating modes: 8 kHz output sampling rate and 16 kHz output sampling rate (or 16 kHz output sample rate and 16kHz bandwidth in case of doubled ASMD clock).

3.11.3 Analog Part

The analog part of the X-GOLD™110 audio front-end in audio-out direction consists of a stereo digital to analog converter (multi-bit oversampling converter) which transforms the output of the digital interpolation filter into analog signals. It is followed by the gain control/amplifier section. The DAC outputs can be switched to several output buffers. In audio-in section there is an input multiplexer which selects either one of two differential microphone inputs to be connected to the low-noise amplifier and analog pre-filter. The signals from the analog pre-filter are input to a second-order sigma-delta analog-to-digital converter. In addition there is a connection for FM-radio playing.

▪ Audio-out Part

The analog audio-out part consists of two multi-bit digital-to-analogue converters (DAC) and an output stage. The signal sources are switched to the output drivers in the output stage. The output drivers consist of: a) one mono, differential class-D Loudspeaker driver, b) one mono, differential Earpiece driver and c) one stereo, single-ended (with uni- or bipolar signals), Headset driver.

▪ **Digital-to-analog converters**

The multi-bit oversampling DACs of the X-GOLD™110 audio front-end convert the 16-bit data words coming from the digital interpolation filters to analogue signals.

▪ **Output Amplifier**

The different output buffers in X-GOLD™110 are driven by the outputs of the selection block. The differential earpiece driver can be used to drive a 16 Ω earpiece and works in differential. The two single ended headset drivers can be used to drive a 16 Ω headset. They can work unipolar mode, where an AC coupling of the headset might be needed, or can work also in bipolor mode. The differential loudspeaker driver can be used to drive a 8 Ω loudspeaker. As it is a class-D amplifier the needed suppression of the higher harmonics of the switching signals
has to be achieved by the external circuitry. The buffers are designed to be short circuit protected.

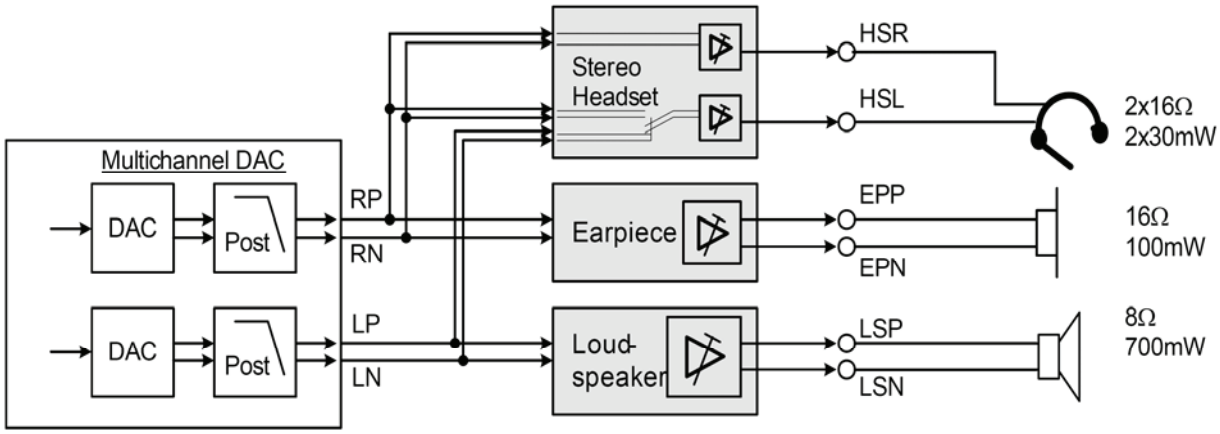


Figure 3.11.3 Switching for R/L DACs onto Buffers

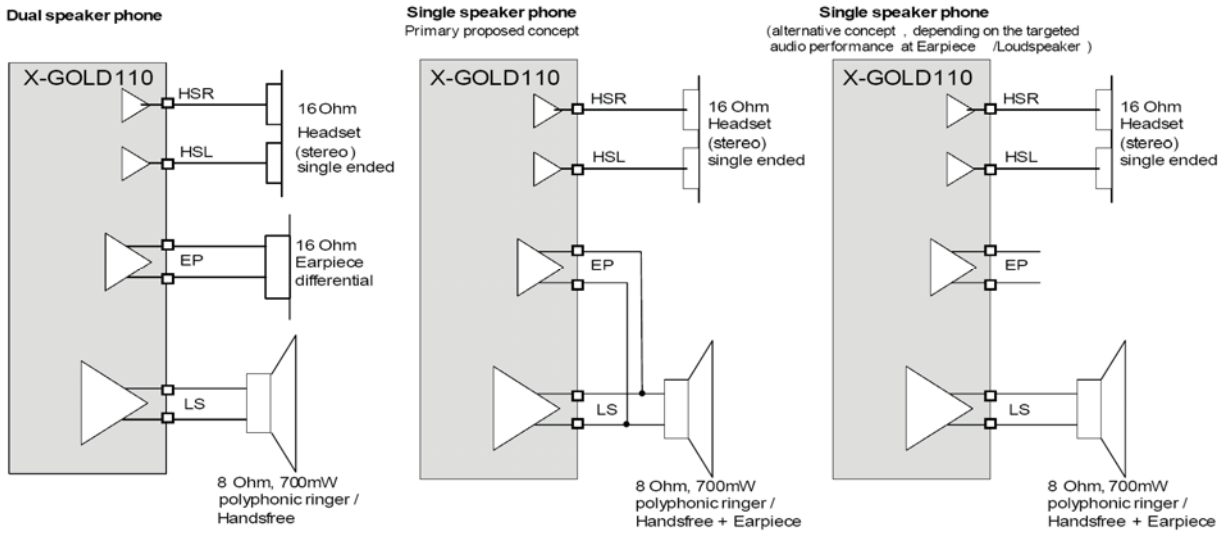


Figure 3.11.4 Different Application Scenarios

In order to achieve the single-speaker concept by parallel connection of Earpiece and Headset amplifier the Earpiece amplifier have to sustain the up to 5 V voltage of the class-D amplifier.

▪ Audio-in Path

The audio-in path of X-GOLD™110 provides two differential microphone input sources, MIC1and MIC2.

• The inputs for microphone MIC1 are MICP1 and MICN1.
• The inputs for microphone MIC2 are MICP2 and MICN2.

The audio-in path consists of an input selector, a low noise amplifier and following pre-filter with gain control, a second order ΣΔ-converter and a digital decimation filter. It supports both standard GSM (bandwidth 3.5 kHz) and wideband (bandwidth 7 kHz) speech bands.
The differential input signal from the microphone first passes a low noise amplifier and following pre-filter and an anti-aliasing pre-filtering stage achieving and overall variable gain ranging from 0 dB to +39 dB . The signal is then modulated by a second order ΣΔ-converter which is clocked with the same clock rate as the digital to analog converters. The ΣΔ-converter delivers a 1-bit pulse density modulated data stream at a rate of 2 MHz to the digital decimation filter which reduces the rate to 8 kHz or 16 kHz, depending on the current mode.
To improve SNR the sample frequency can be doubled in dedicated modes and the modulated data stream is 4MHz instead of 2 MHz.

▪ Microphone Supply

X-GOLD™213 has a single ended power-supply concept for electret microphones:
For both modes a minimal load capacitance of t.b.d. nF is necessary to guarantee stable operation of the buffer. The maximal load capacitance must not exceed t.b.d. nF.
2 microphone supplies VMIC and VUMIC are available. The supply VUMIC has a ultra-low-power mode, where the current consumption is minimum, whilst at the same time the noise performance is reduced.
For this purpose the VUMIC is directly supplied out of the VMIC regulator, the Mic-Buffer can be switched off and only the quiescent current of the VMIC regulator is present. This mode can be used to supply a headset and allow accessory detection with highly reduced current consumption For normal operation the supply can be switched to normal operation mode with improved noise performance. In case of an digital microphone VMIC can be used for supplying this microphone.

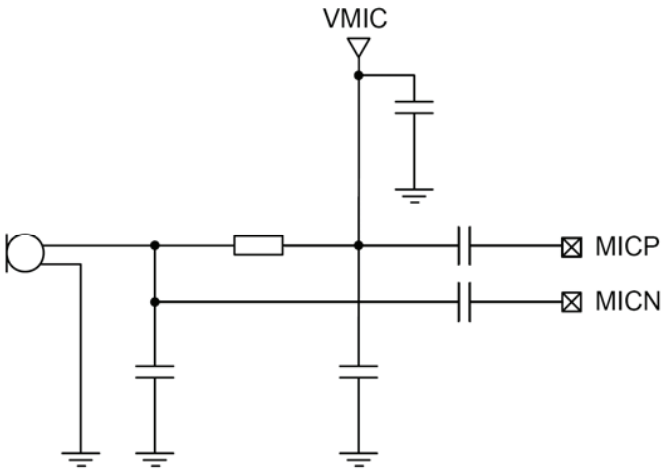


Figure 3.11.5 Typical Microphone Supply Generation (alternative)

3.12 KEY BACLKLIGHT LED Interface

Key Backlight LED is controlled by switch (Q202). If KEY_BCKLIGHT is high, Current is flowing from VBAT to LED. Then Light emitted from The LED.

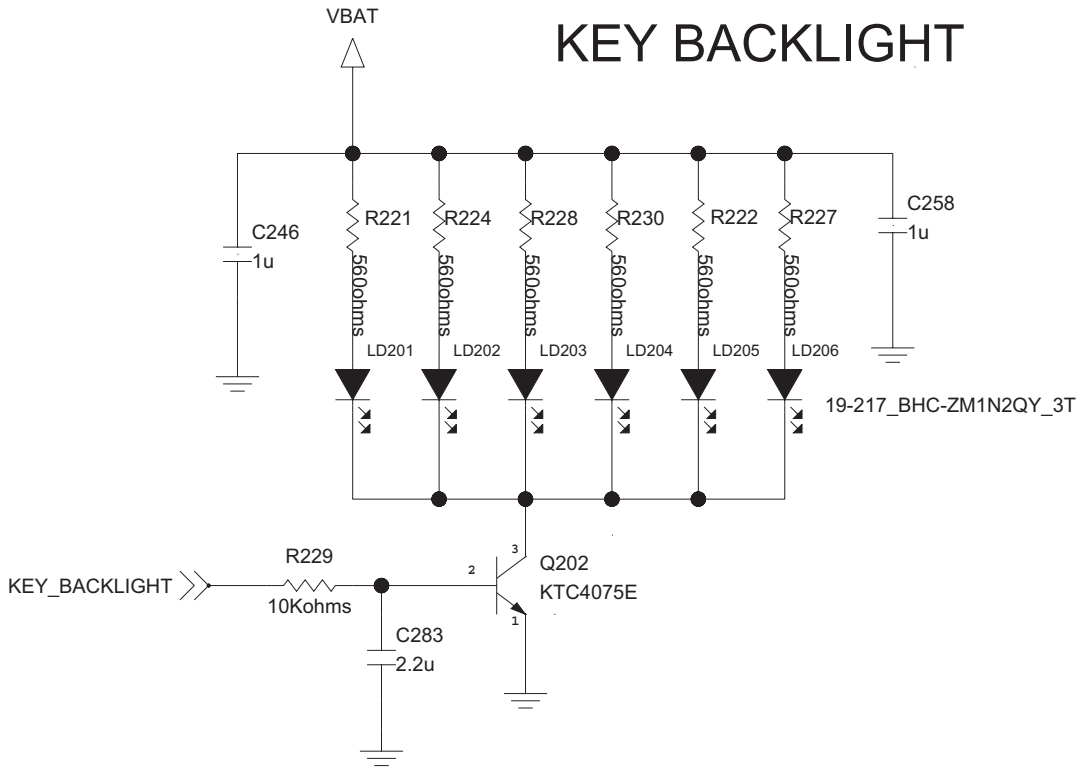


Figure 3.12.1 Key Backlight Block

3.13 Vibrator Interface

Support PWM signal which generated by hardware itself via register control
Direct connect to the VIB and VSSVIB pin from XMM110 without any external component required
It is capable to driver the vibrator motor up to 150mA

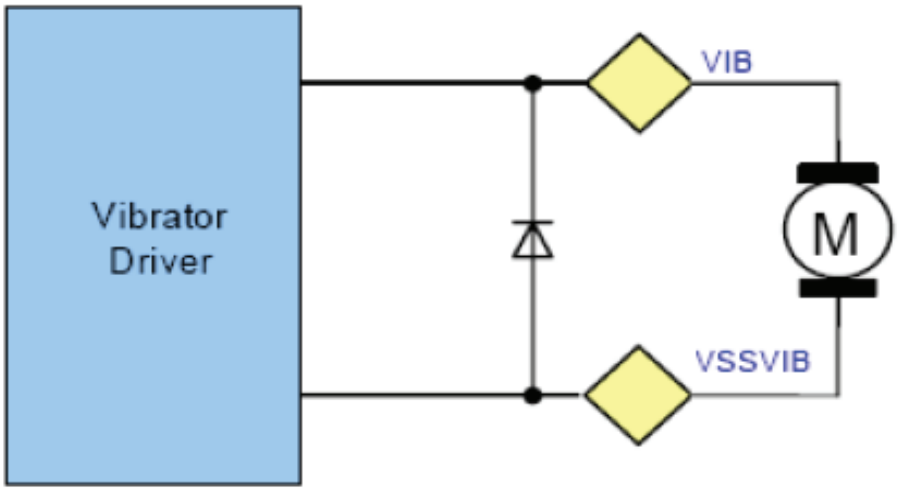


Figure 3.13.1 Vibrator Driver Block Diagram

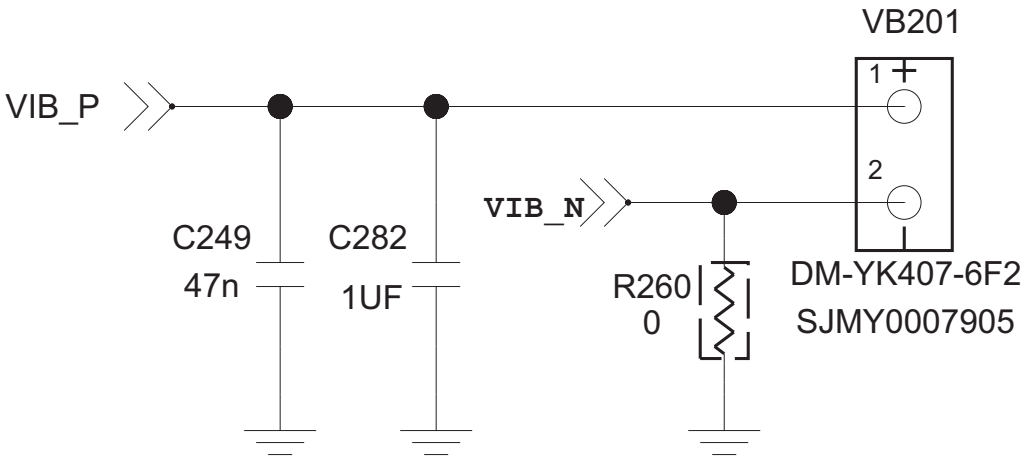
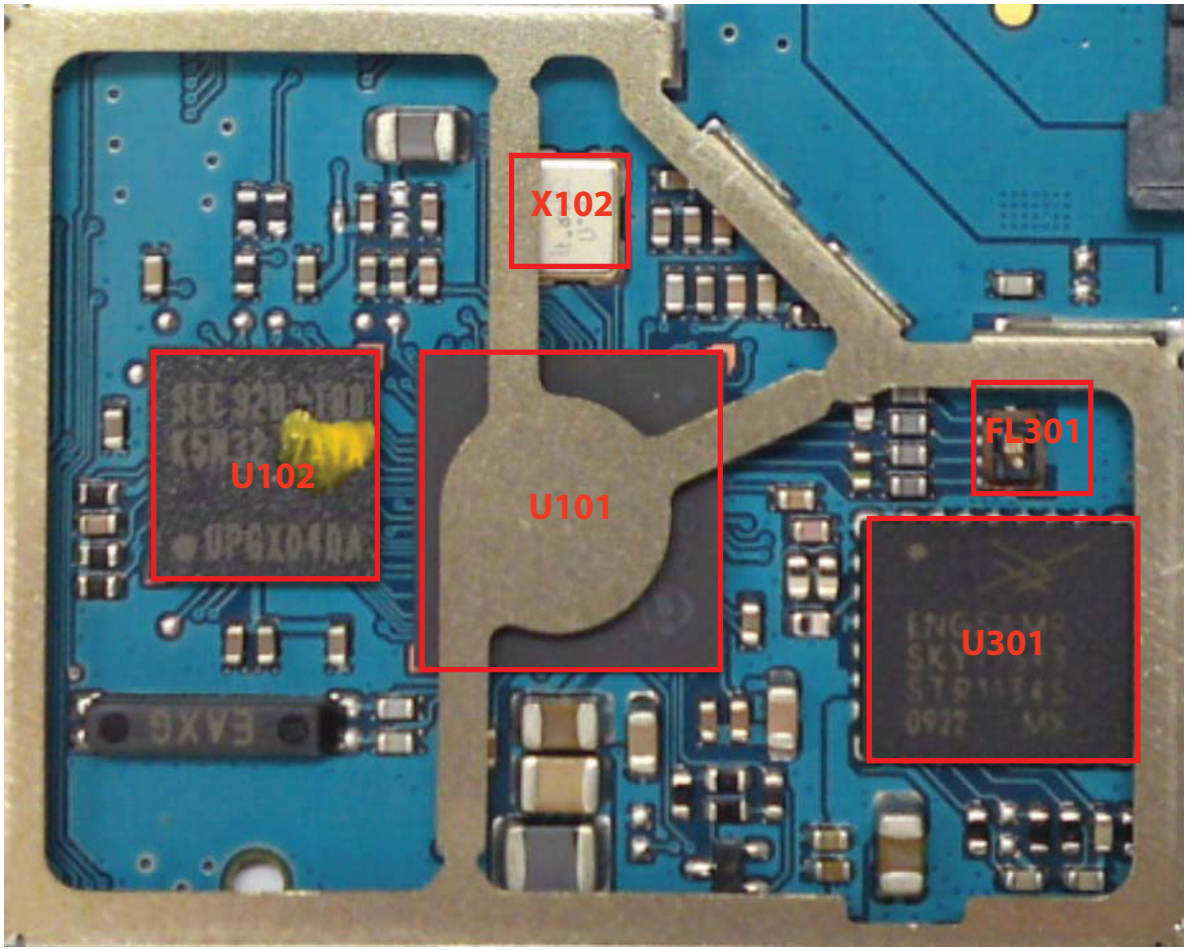


Figure 3.13.2 Vibrator Driver Block

4. TROUBLE SHOOTING

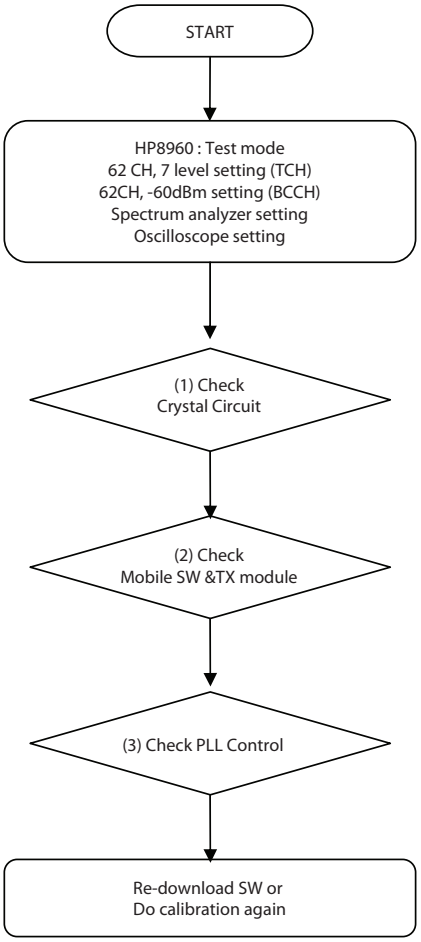
4.1 RF Component



U101	Main Chip (EGV3)
U102	Memory
U301	FEM (Tx Module)
FL301	SAW Filter
X101	Crystal, 26MHz Clock

4.2 RX Trouble

CHECKING FLOW



(1) Checking Crystal Circuit

TEST POINT

1 pin : 26MHz

X102

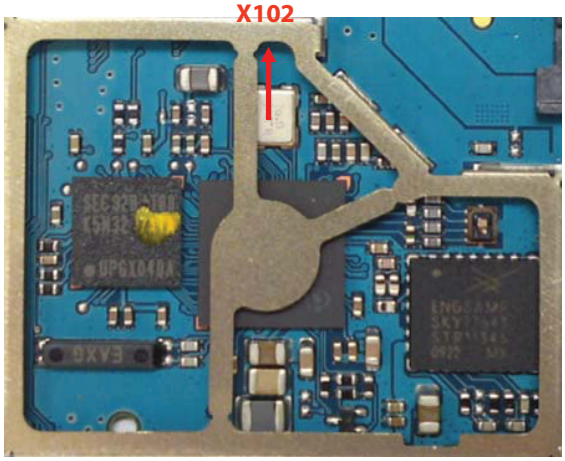
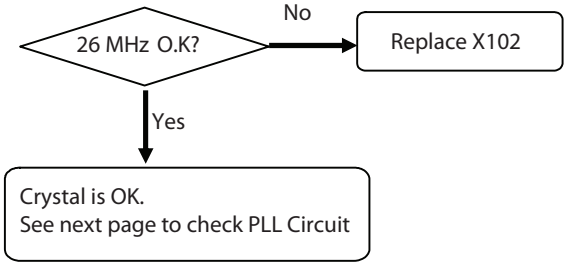


Figure 4.2.1

CHECKING FLOW



CIRCUIT

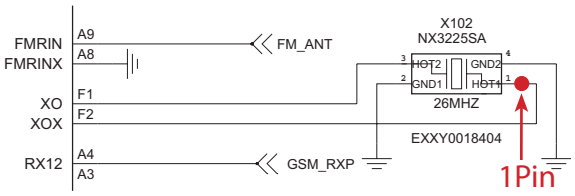


Figure 4.2.2

WAVEFORM

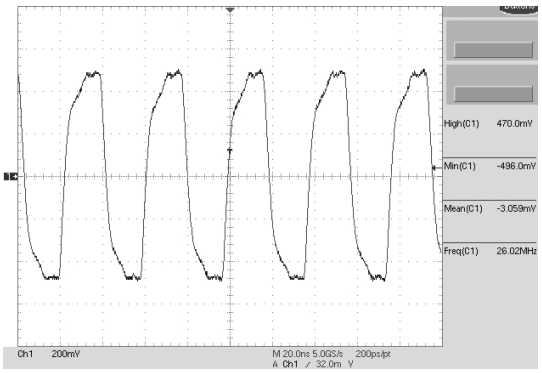


Figure 4.2.3

(2) Checking Mobile SW &FEM

TEST POINT

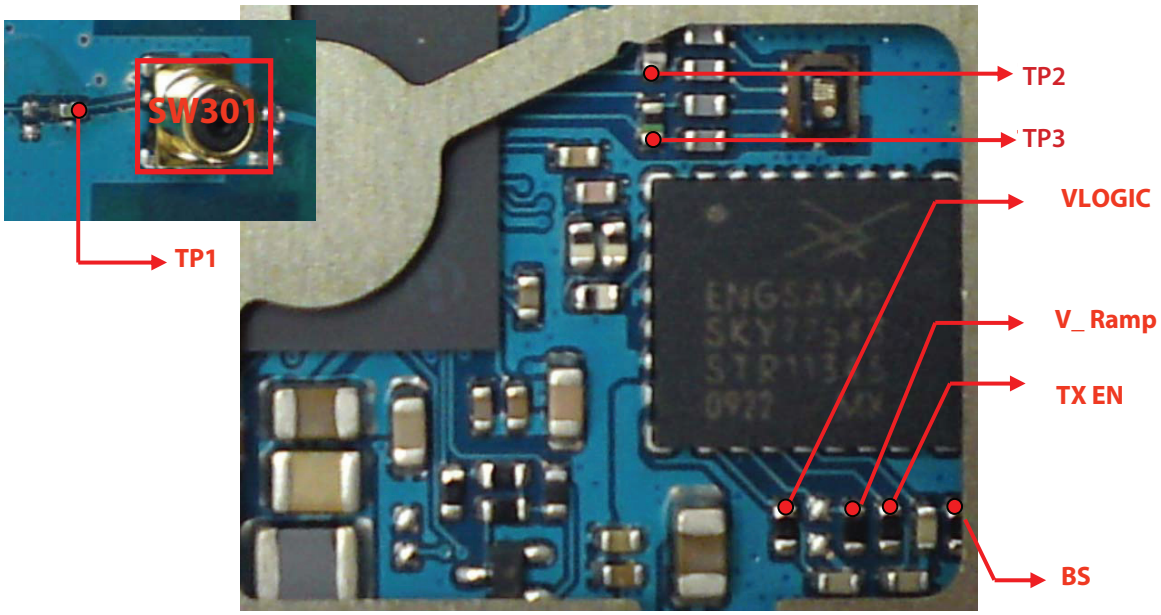
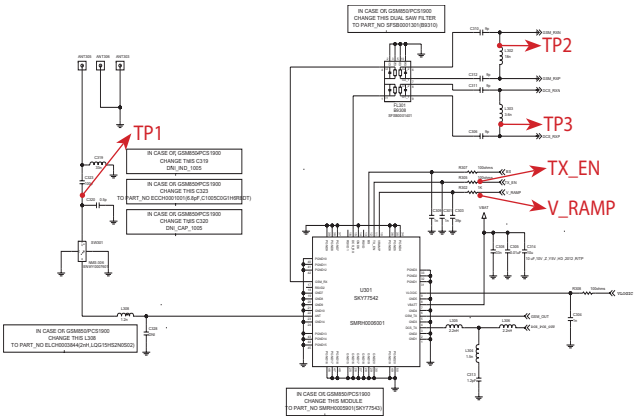


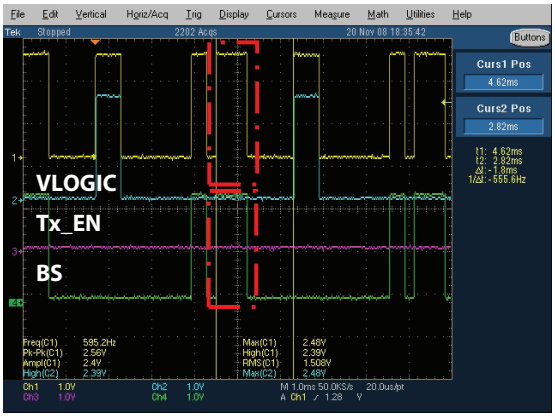
Figure 4.2.4

CIRCUIT

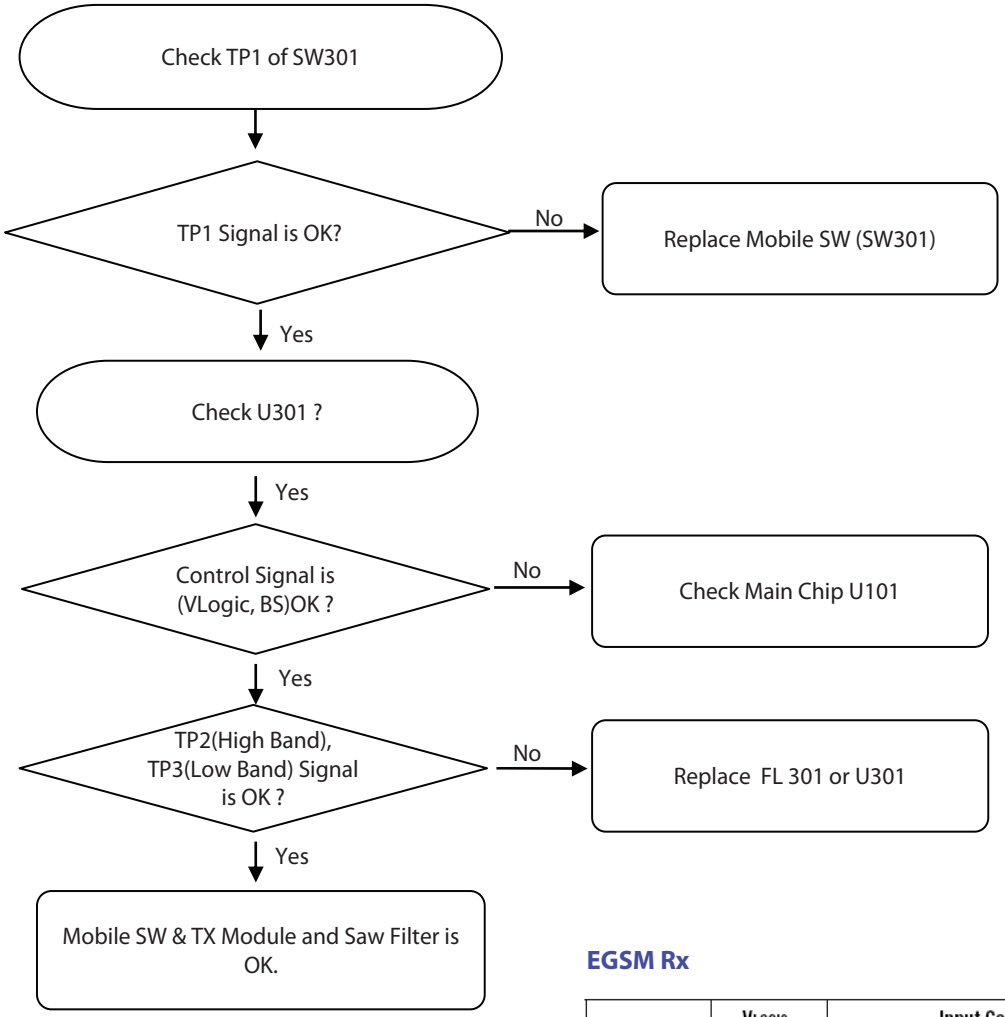


CONTROL LOGIC

EGSM Rx



CHECKING FLOW



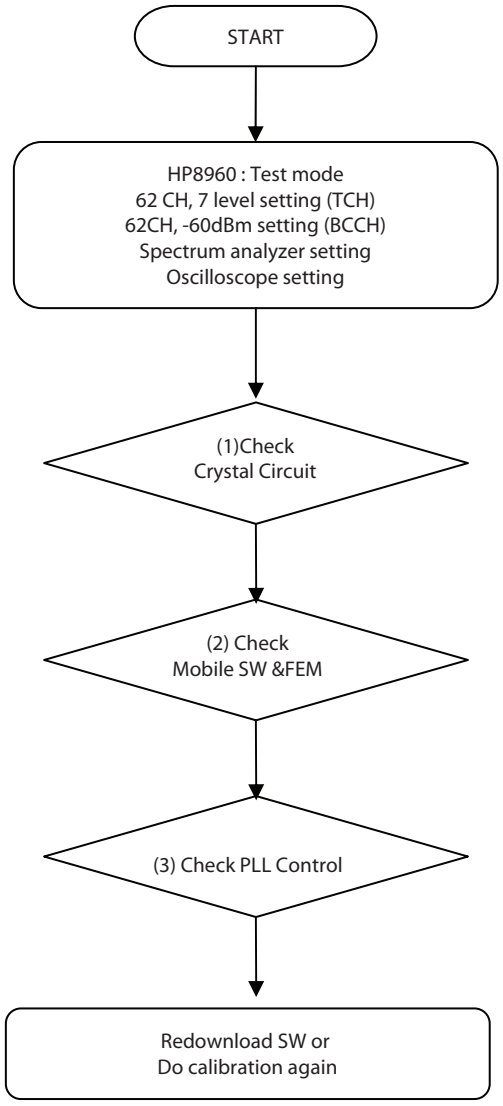
EGSM Rx

Mode	VLOGIC	Input Control Bits	
		Tx_EN	BS
STANDBY	0	X [1]	X [1]
GSM_Rx	1	0	0
DCS_Rx	1	0	1
GSM_Tx	1	1	0
DCS_Tx	1	1	1

[1] X = don't care

4.3 TX Trouble

CHECKING FLOW



(1) Checking Crystal Circuit

TEST POINT

1 pin : 26MHz

X102

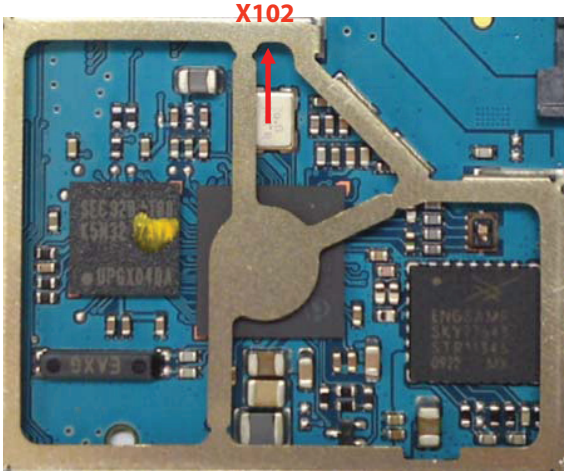
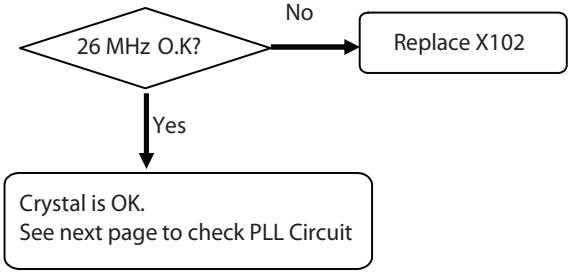


Figure 4.2.1

CHECKING FLOW



CIRCUIT

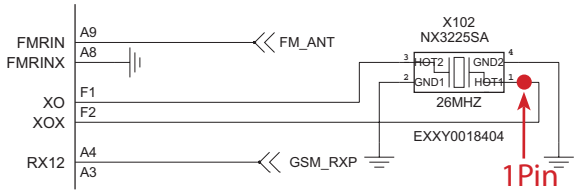


Figure 4.2.2

WAVEFORM

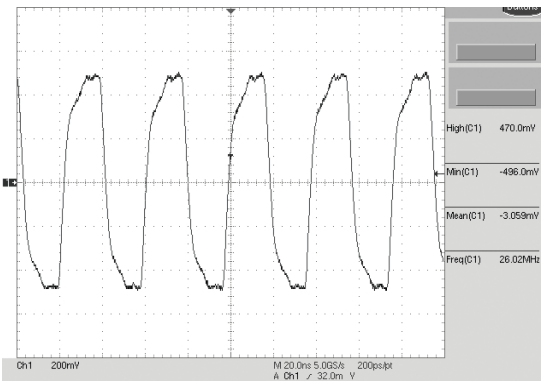


Figure 4.2.3

TEST POINT

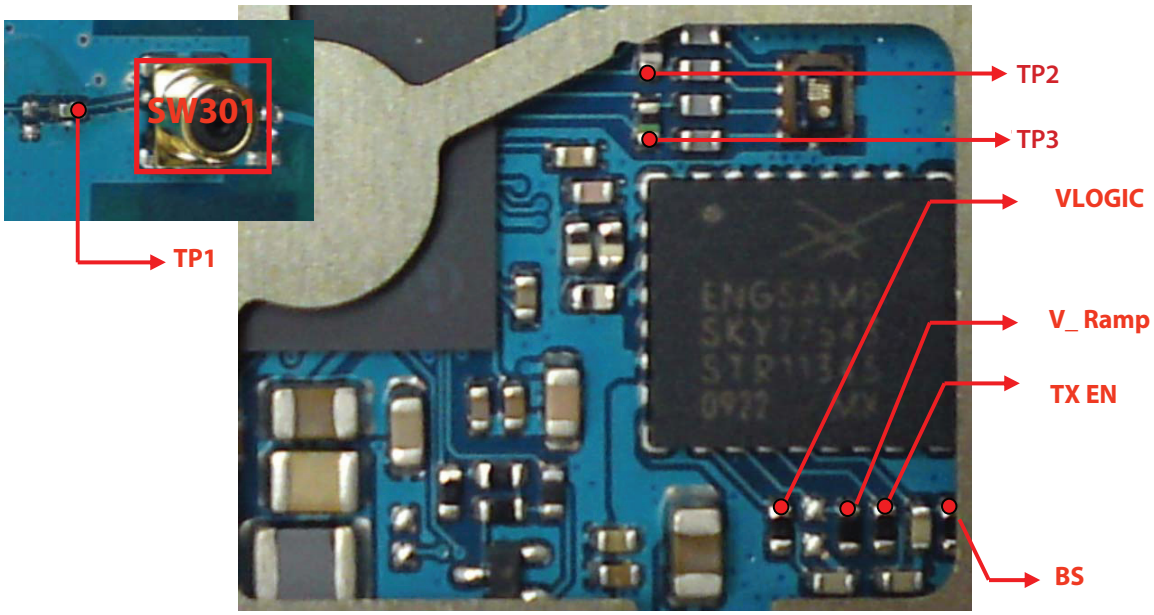
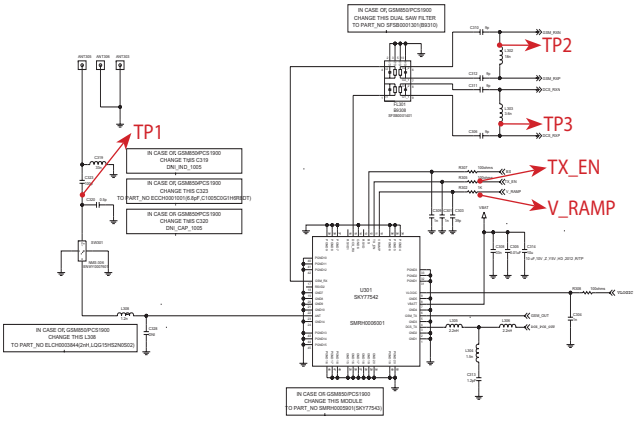


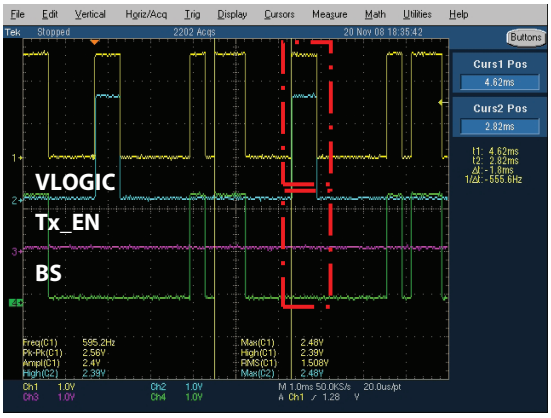
Figure 4.2.4

CIRCUIT

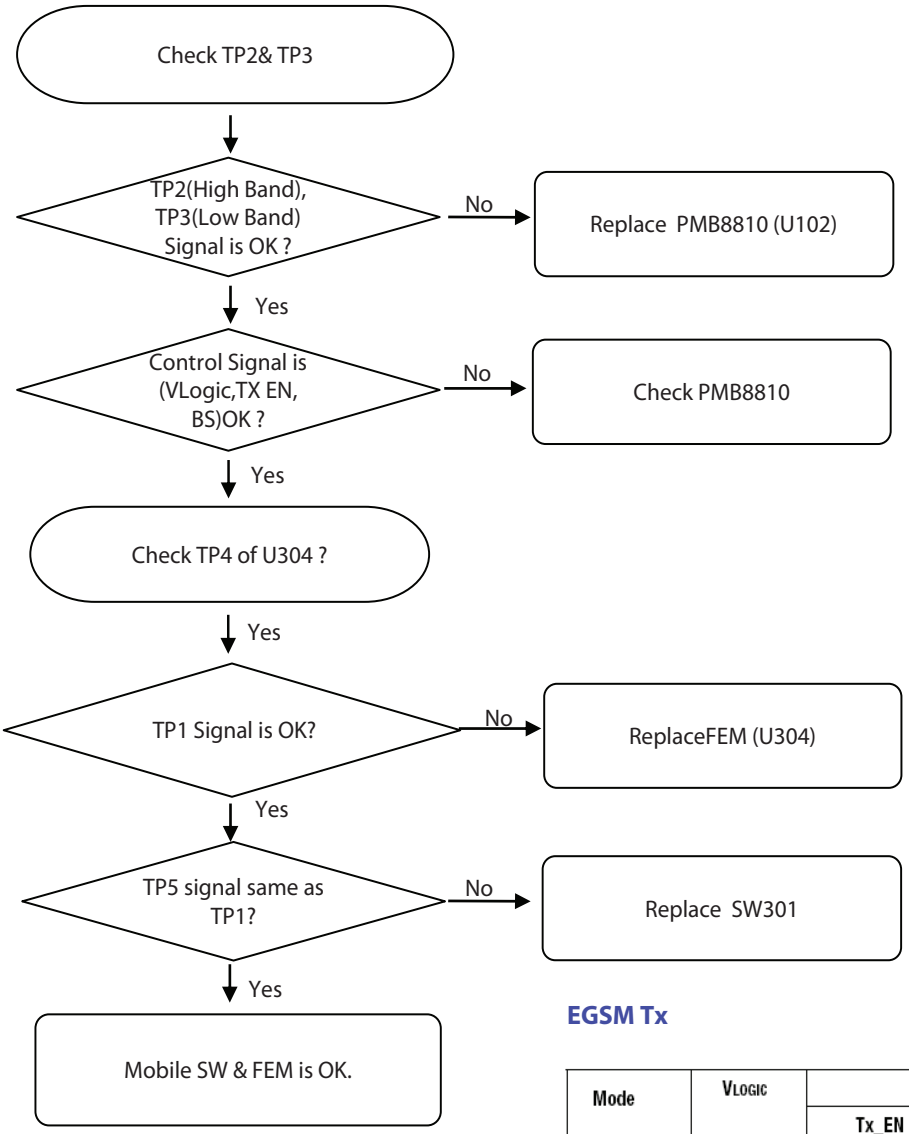


CONTROL LOGIC

EGSM Tx



CHECKING FLOW



EGSM Tx

Mode	VLOGIC	Input Control Bits	
		Tx_EN	BS
STANDBY	0	X [1]	X [1]
GSM_Rx	1	0	0
DCS_Rx	1	0	1
GSM_Tx	1	1	0
DCS_Tx	1	1	1

[1] X = don't care

4.4 Power On Trouble

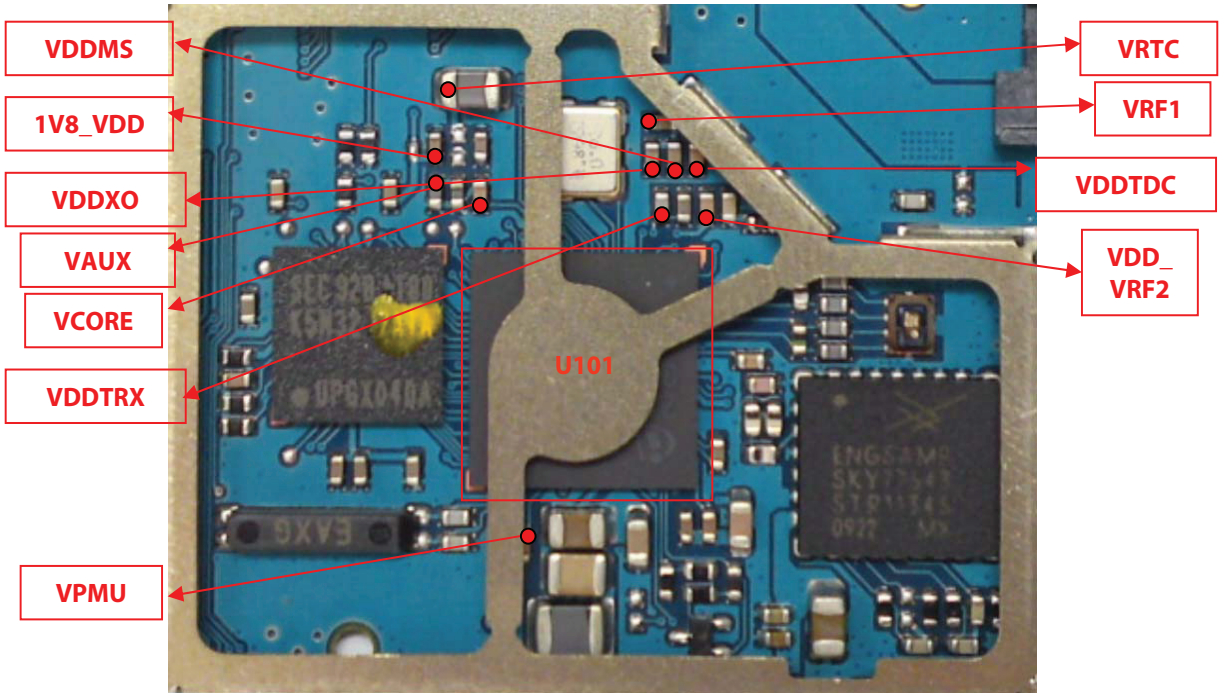


Figure 4.4.1

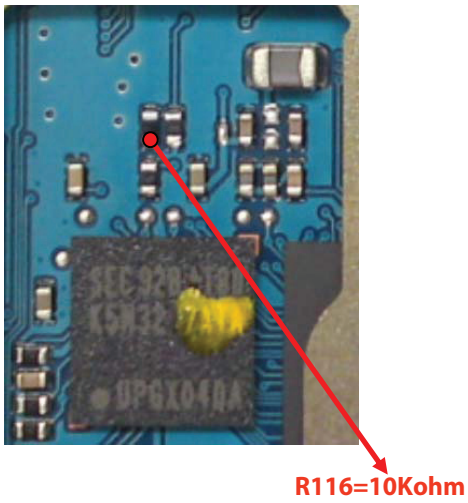


Figure 4.4.2

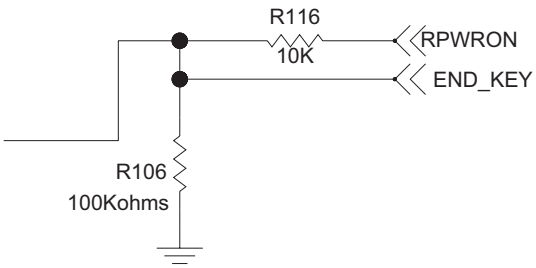


Figure 4.4.3 Remote power on

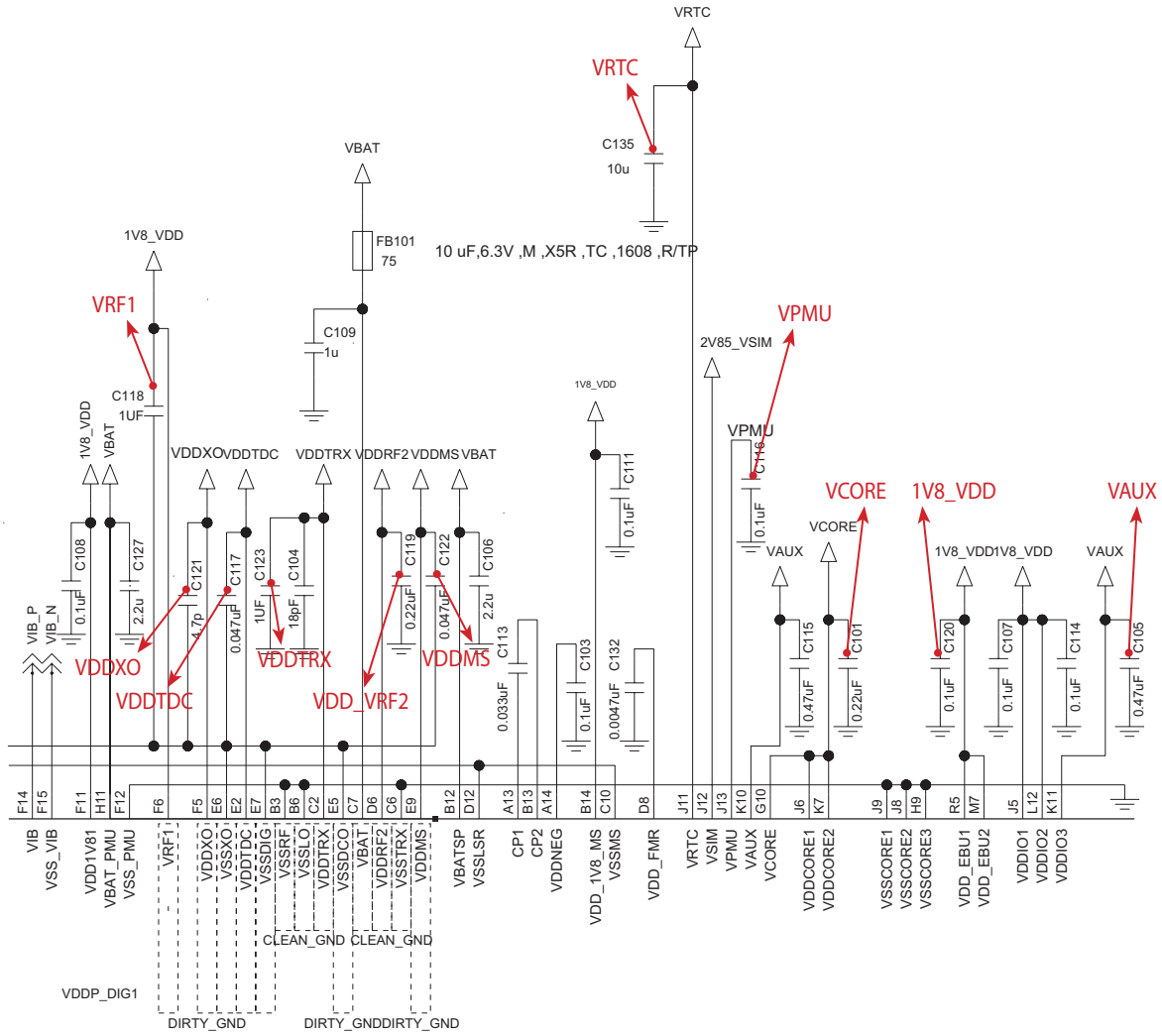
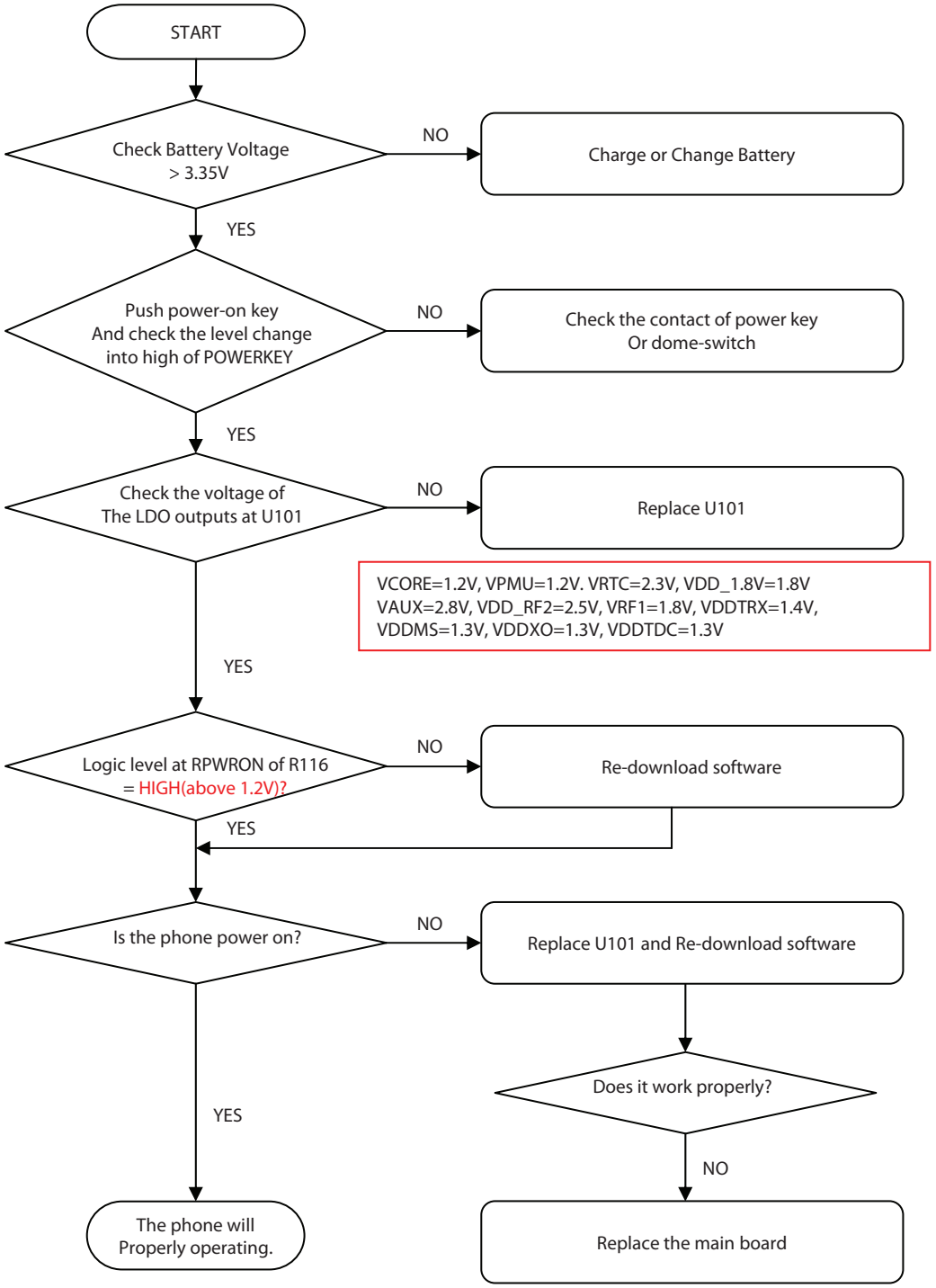


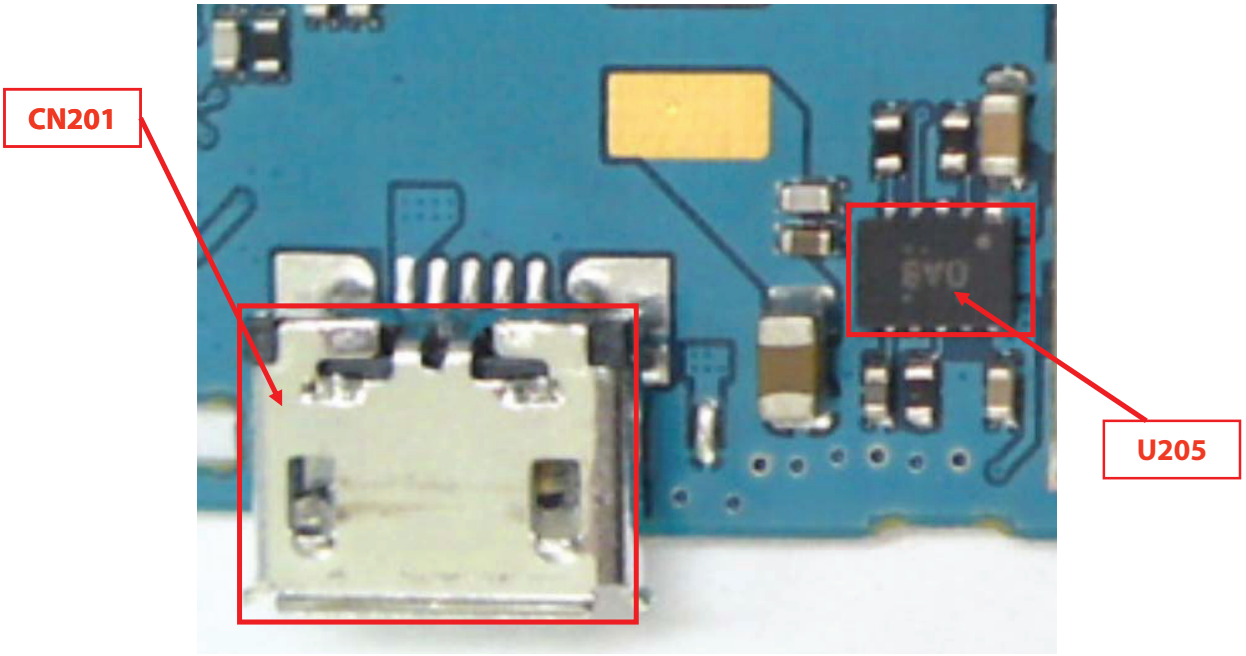
Figure 4.4.4 power block of GS107

CHECKING FLOW



4.5 Charging Trouble

TEST POINT



CIRCUIT

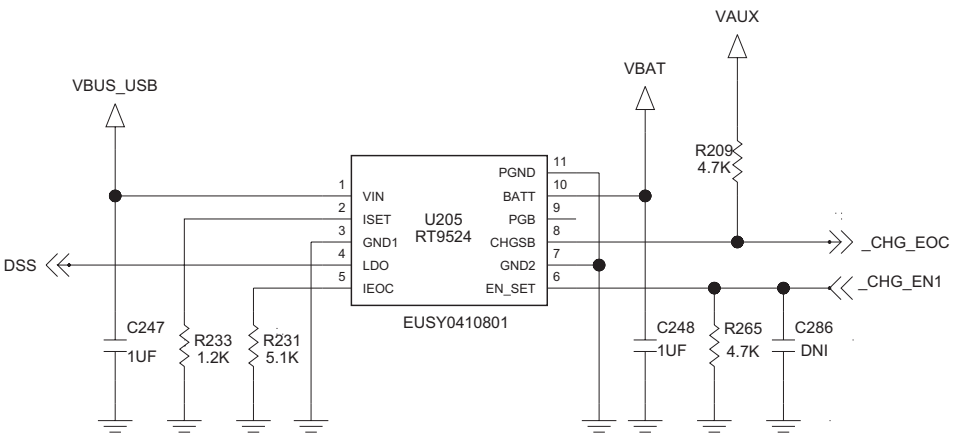
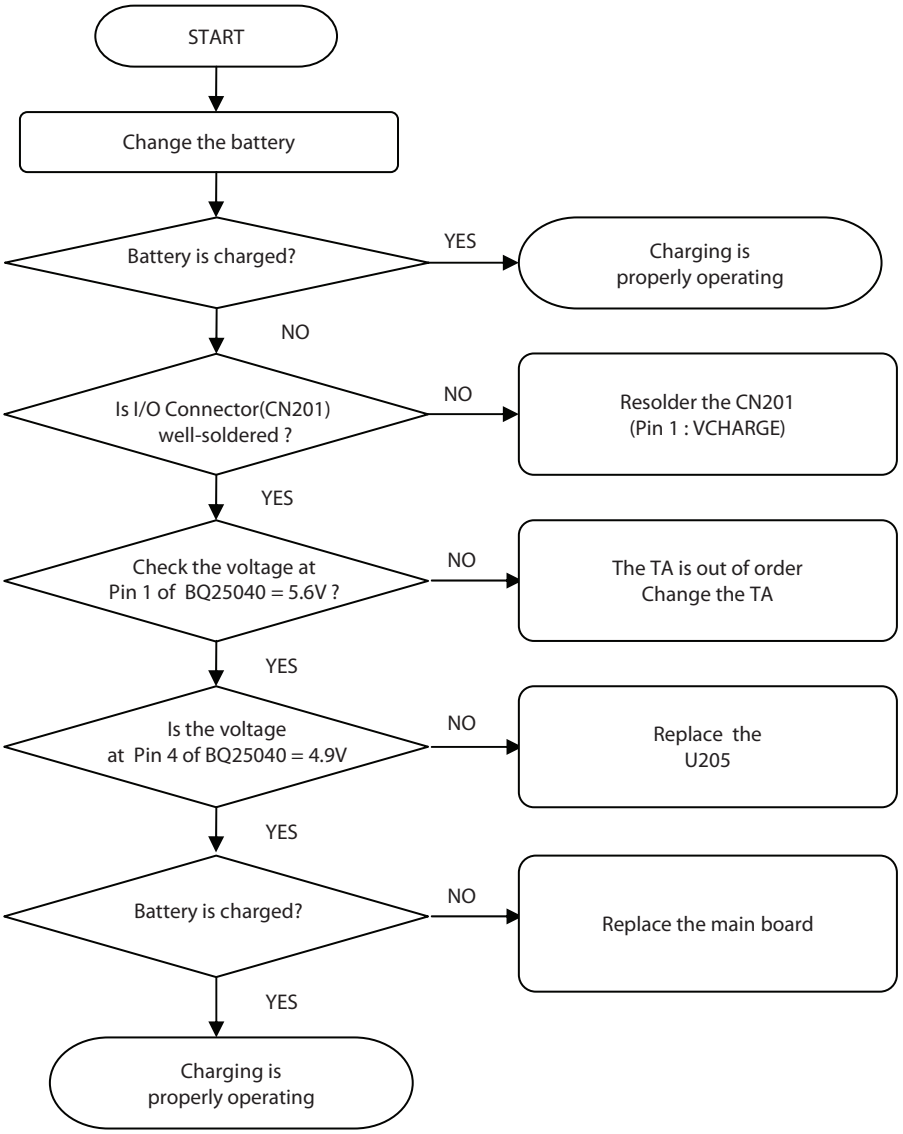


Figure 4.5.2

CHECKING FLOW



4.6 Vibrator Trouble

TEST POINT

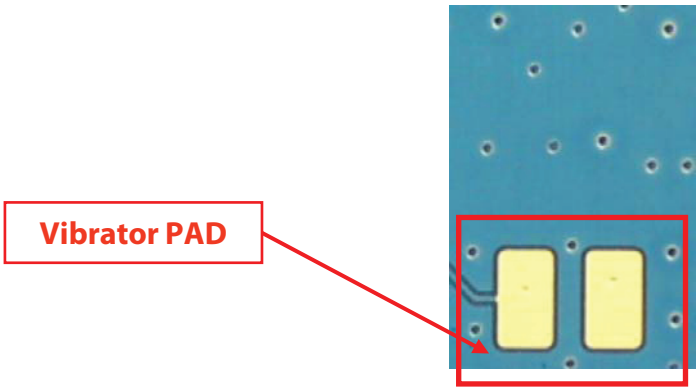


Figure 4.6.1

CIRCUIT

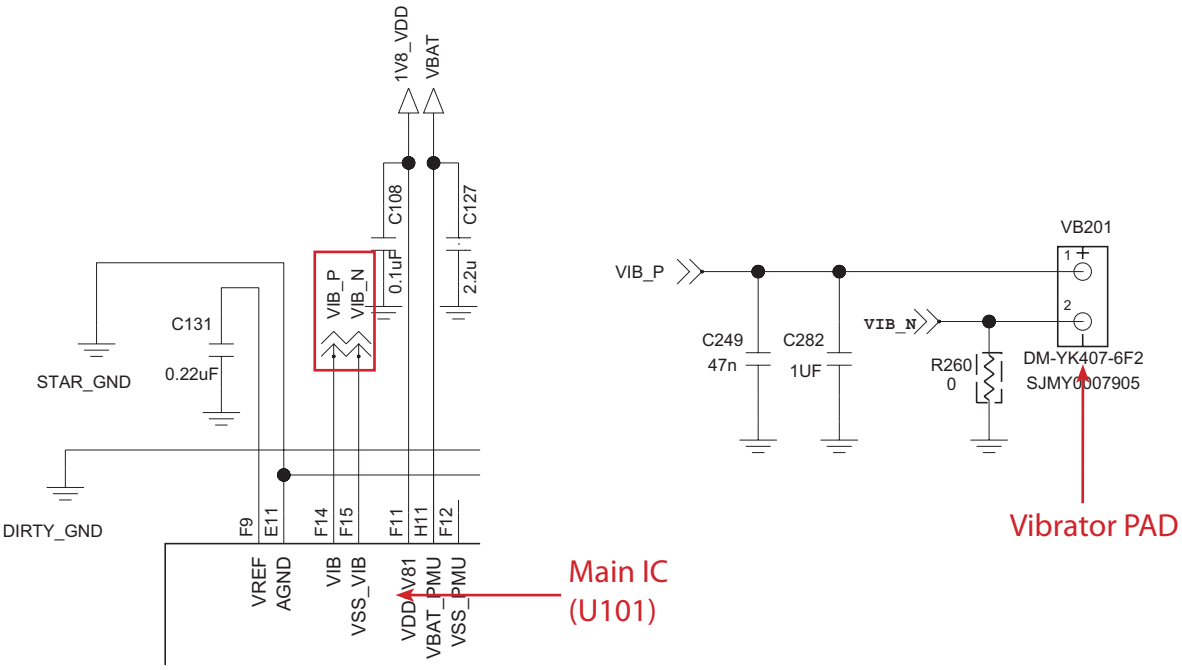
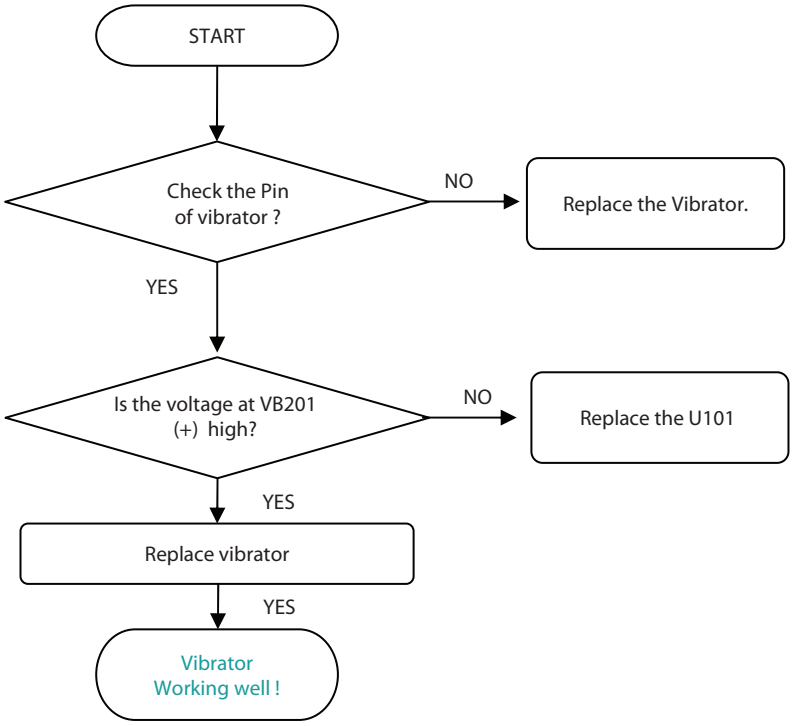


Figure 4.6.2

CHECKING FLOW

SETTING : Enter the engineering mode, and set vibrator on at vibration of BB test menu



4.7 LCD Trouble

TEST POINT

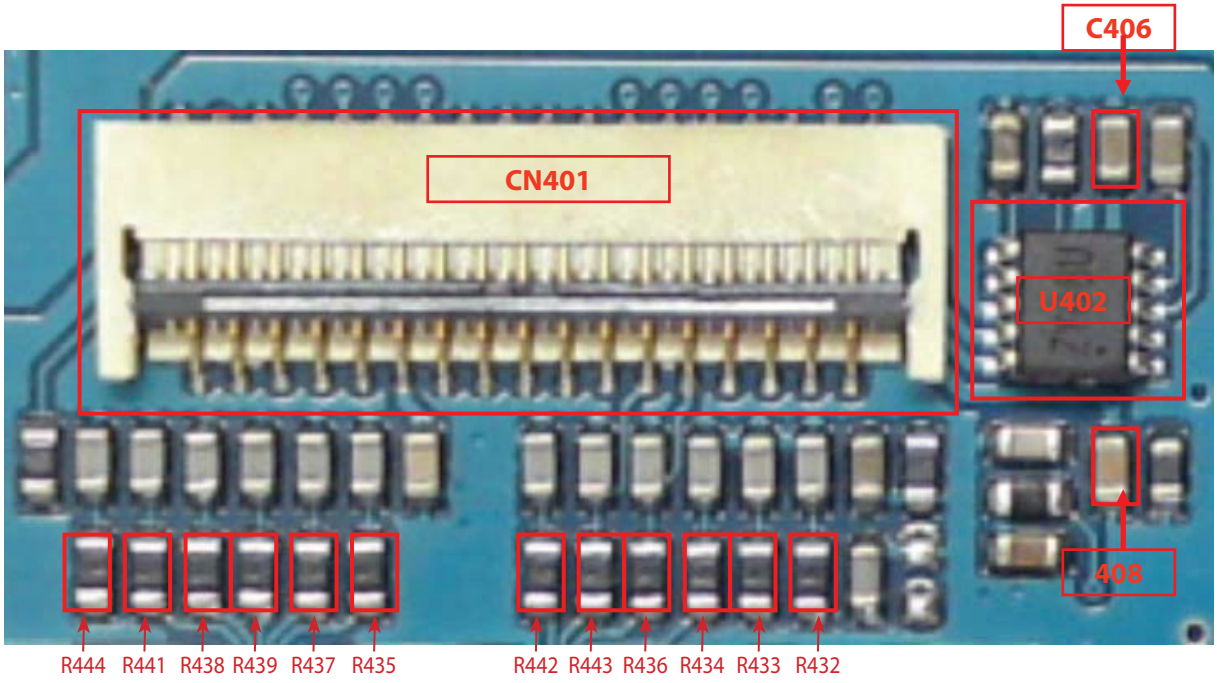


Figure 4.7.1

CIRCUIT

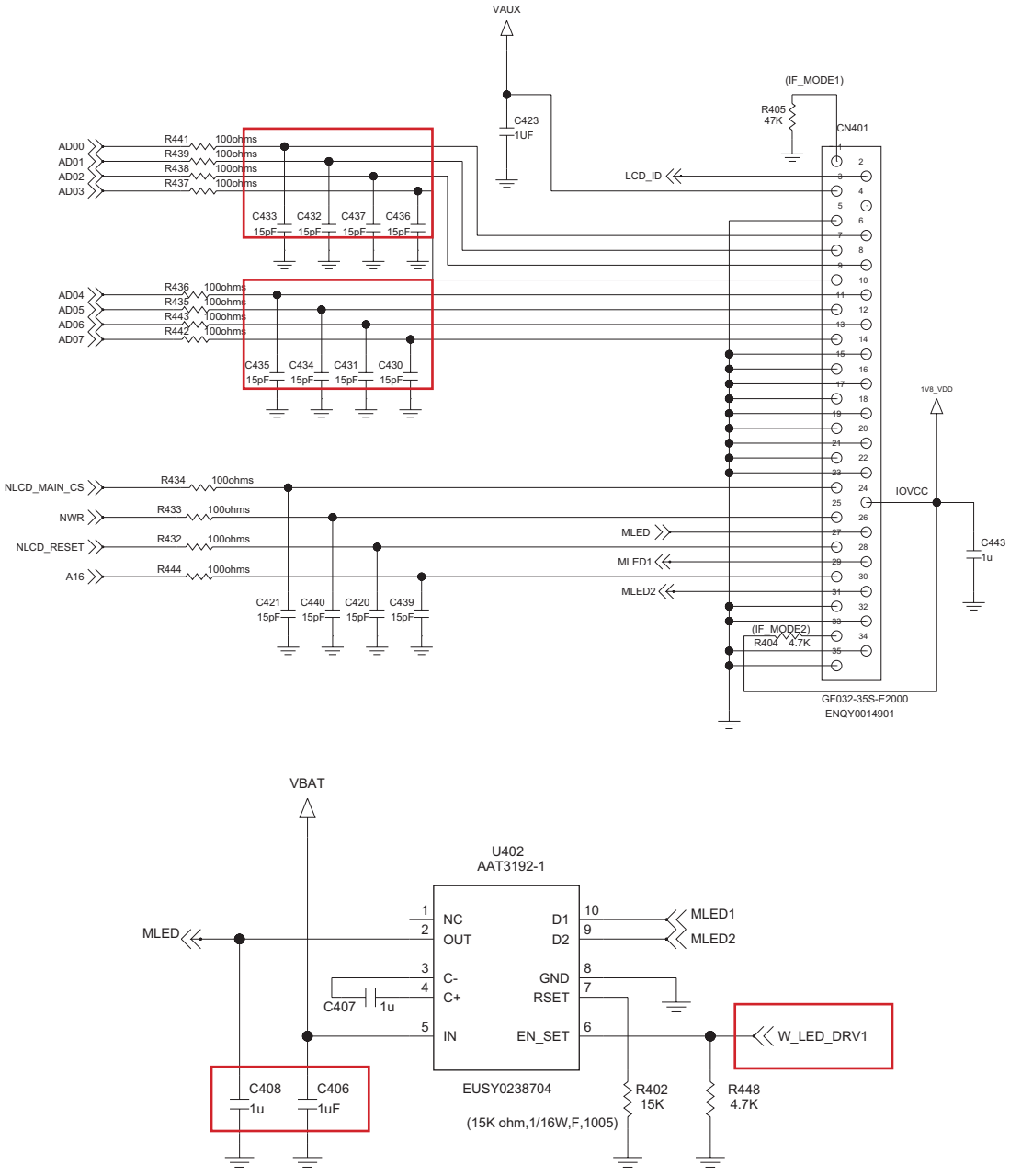
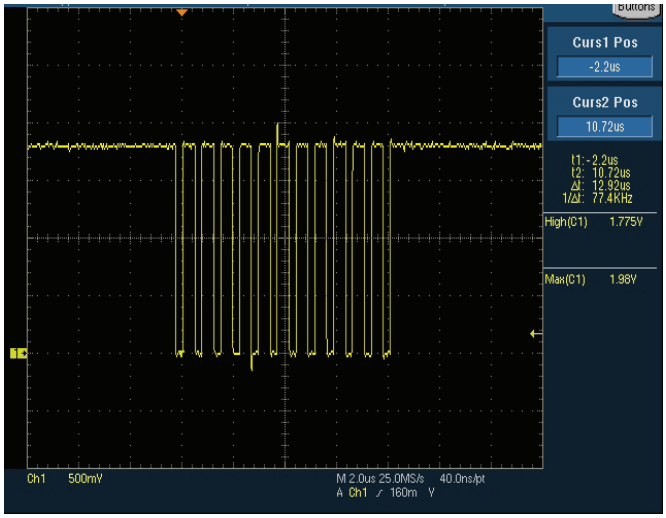
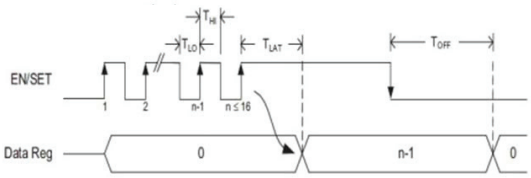


Figure 4.7.2

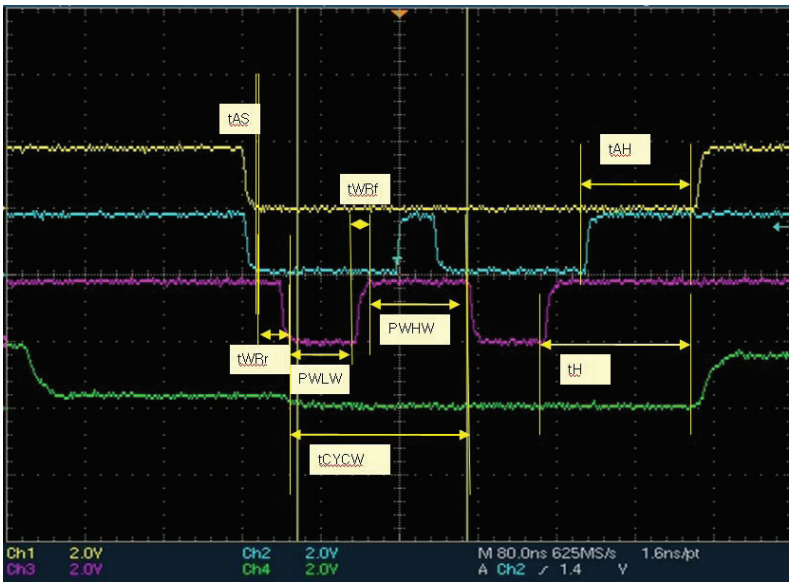
Waveform





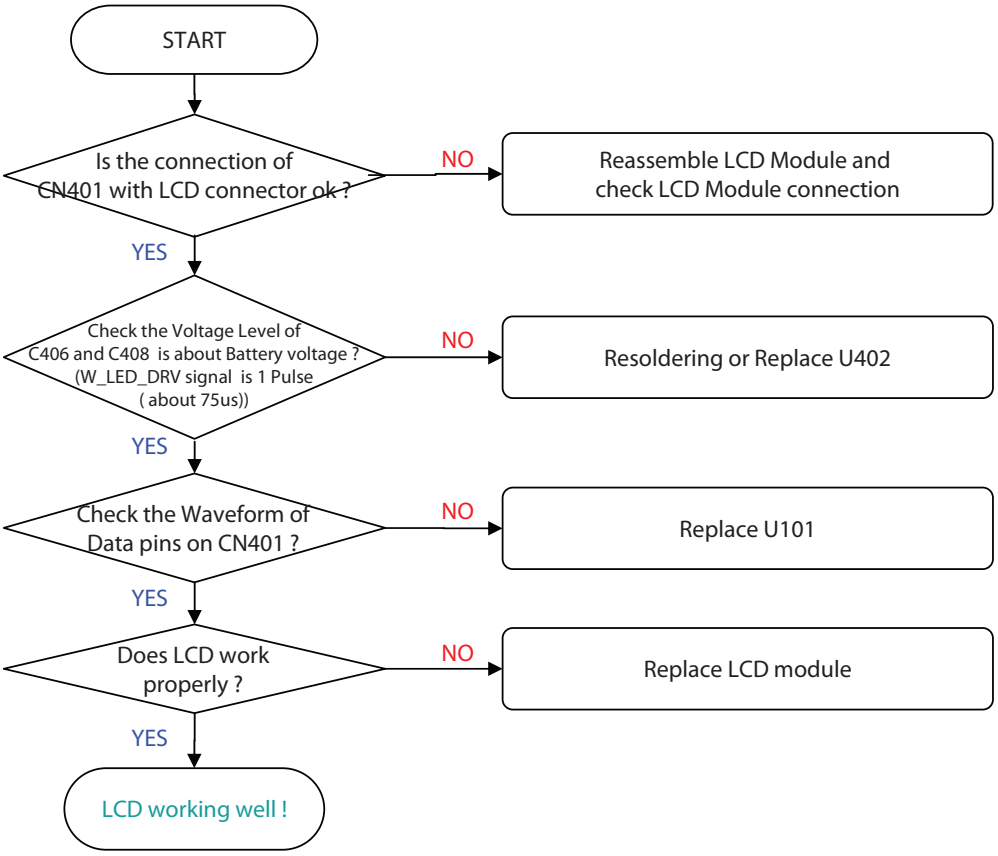
Data	EN Rising Edges	D1-D2 Current (mA)
1	1	20
2	2	18.7
3	3	17.3
4	4	16
5	5	14.7
6	6	13.3
7	7	12
8	8	10.7
9	9	9.3
10	10	8
11	11	6.7
12	12	5.3
13	13	4
14	14	2.7
15	15	1.3
16	16	0.63

Graph 4.7.1. LCD Backlight Dimming Control Signal Waveform



Graph 4.7.2. LCD Data Waveform

CHECKING FLOW



4.8 Speaker Trouble

TEST POINT

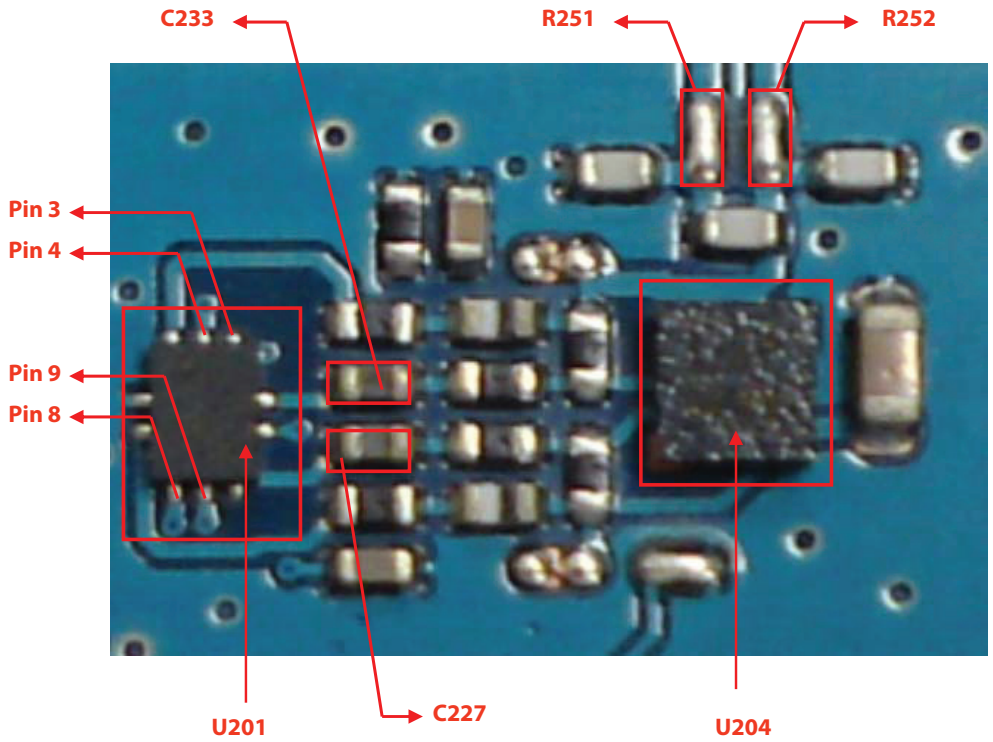
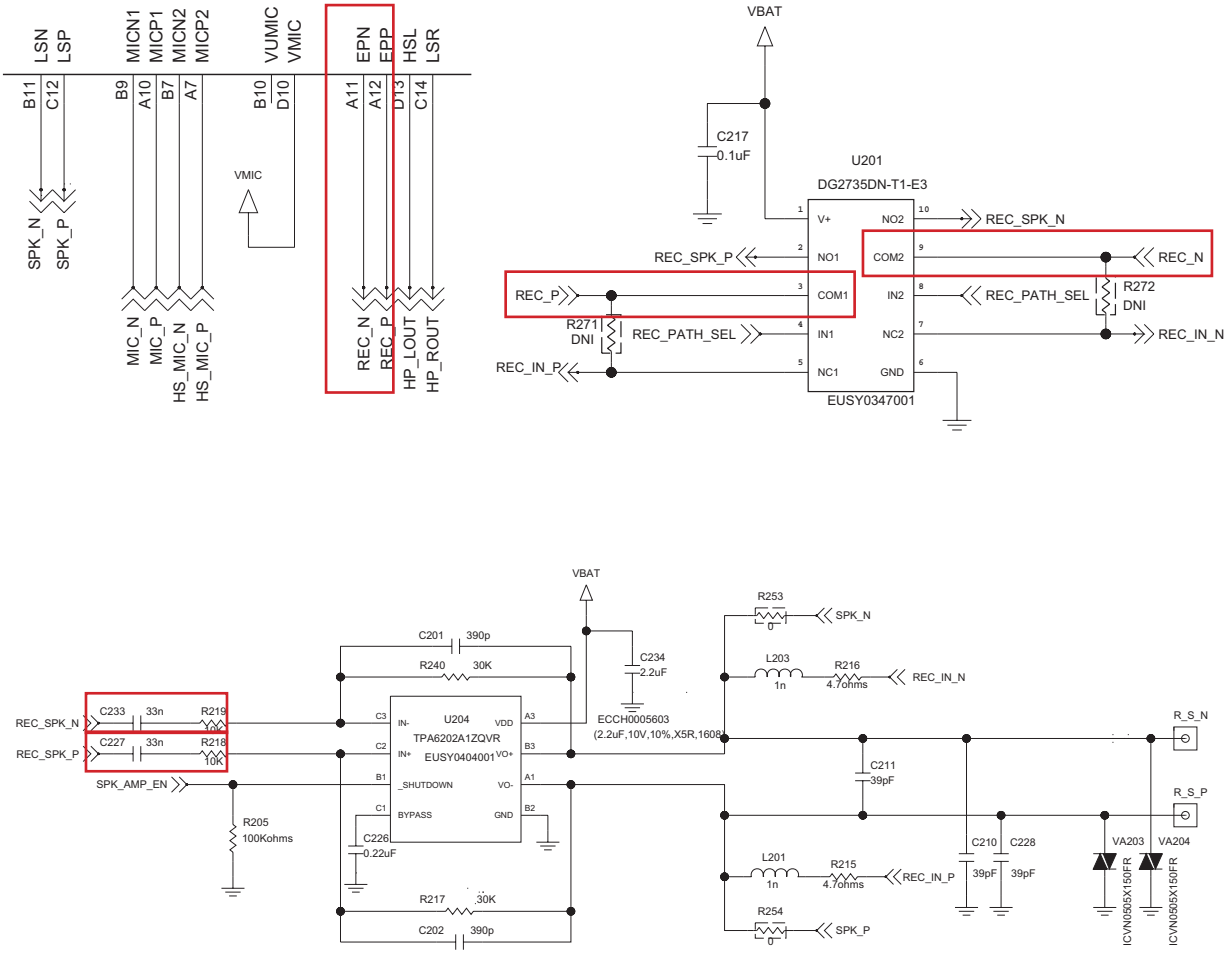
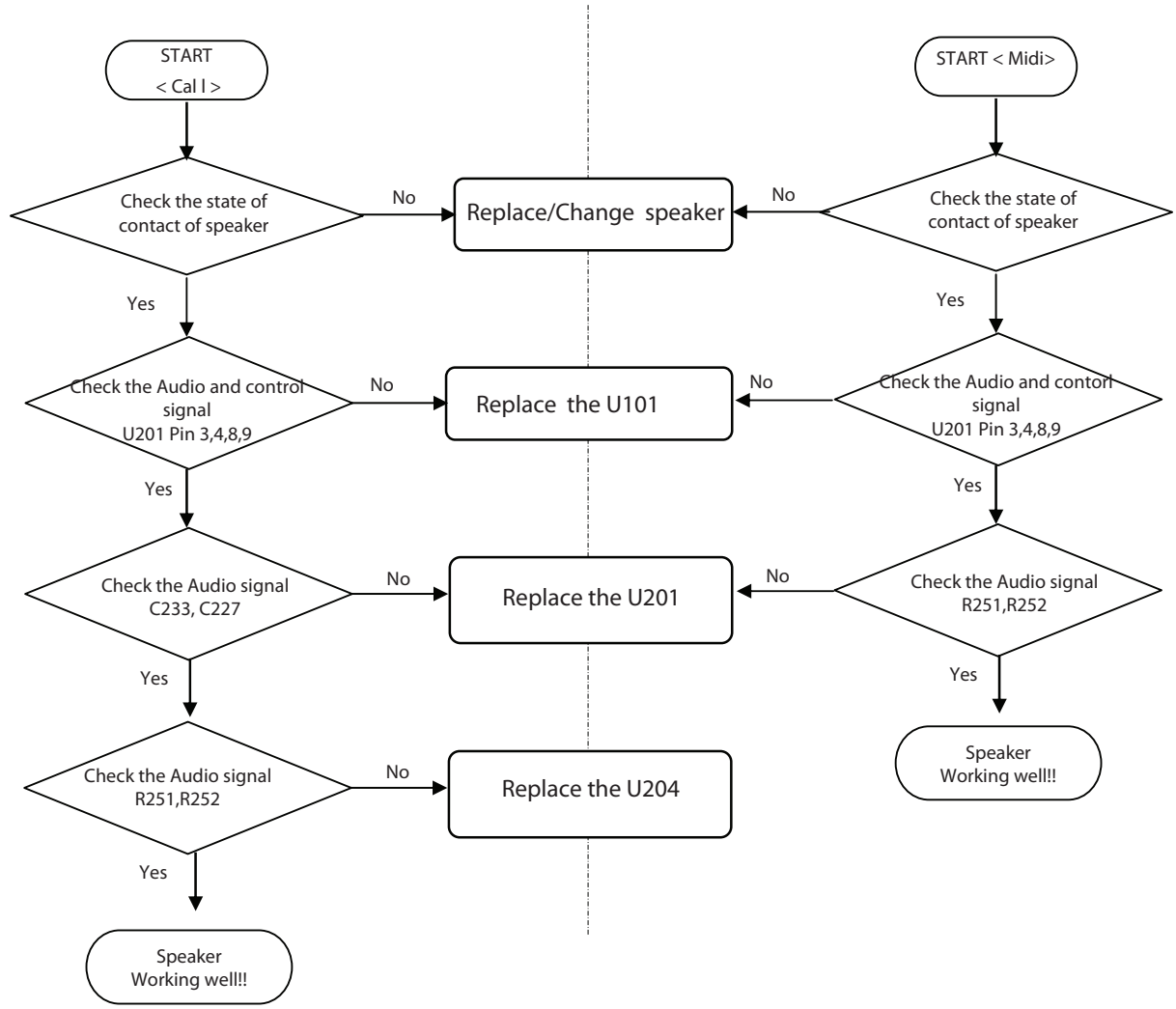


Figure 4.8.1

CIRCUIT



CHECKING FLOW



4.9 Earphone Trouble

TEST POINT

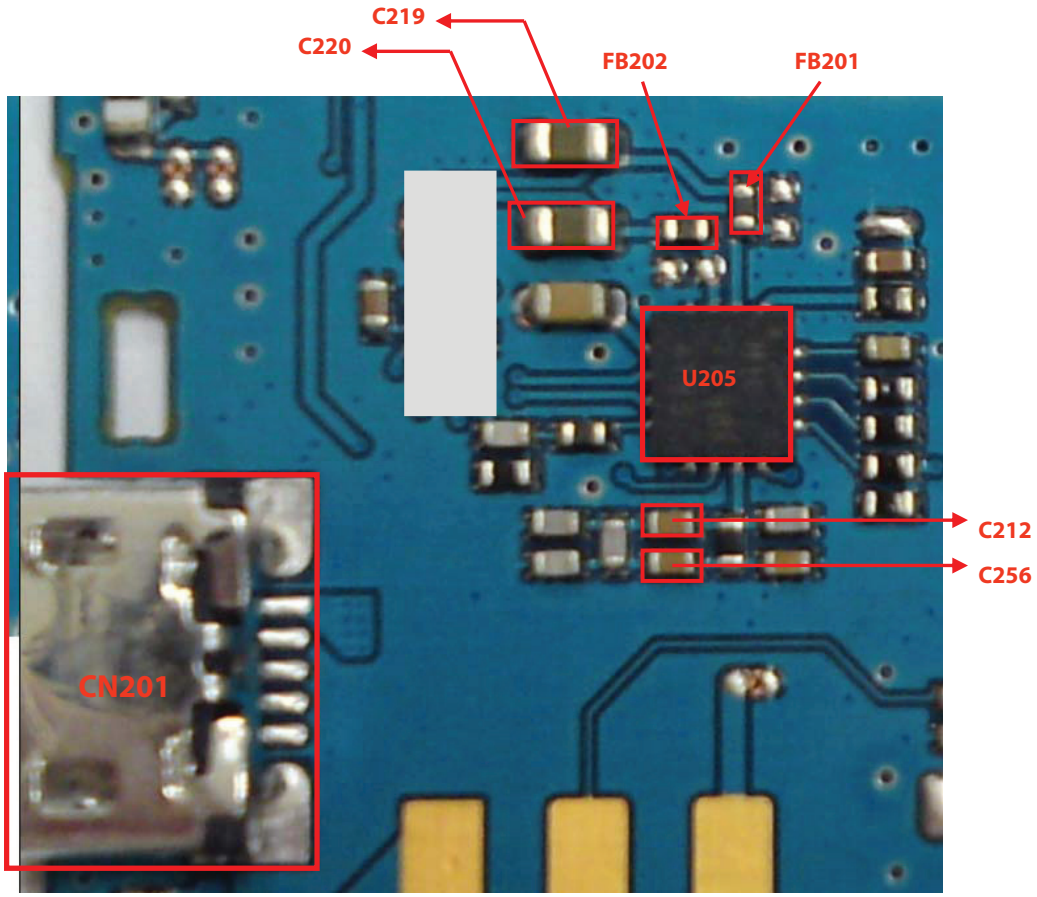
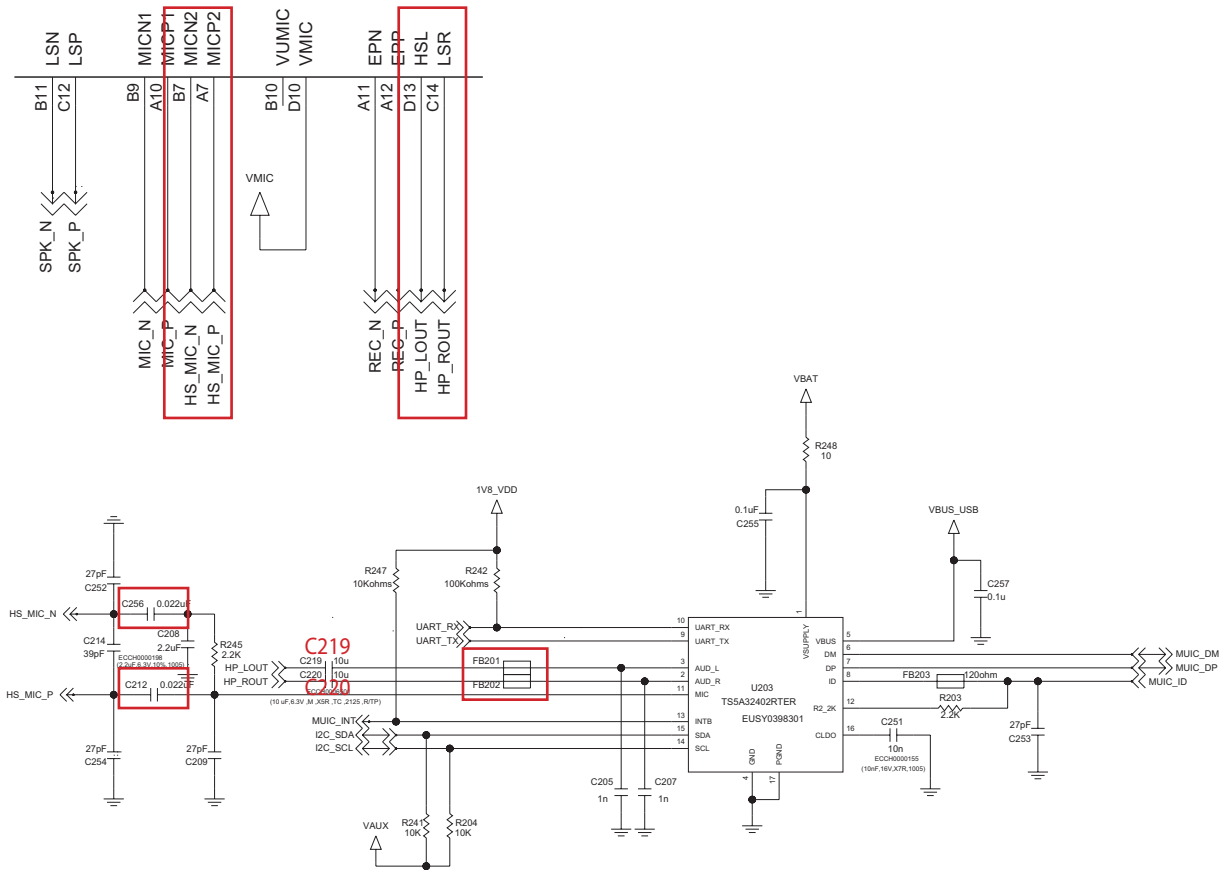
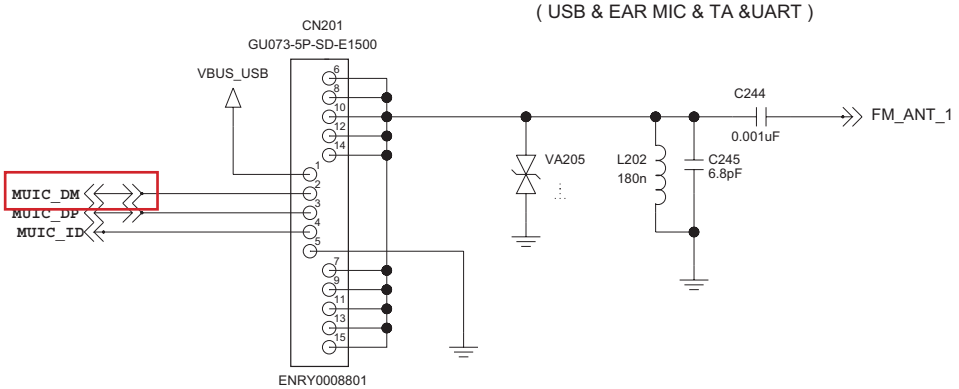


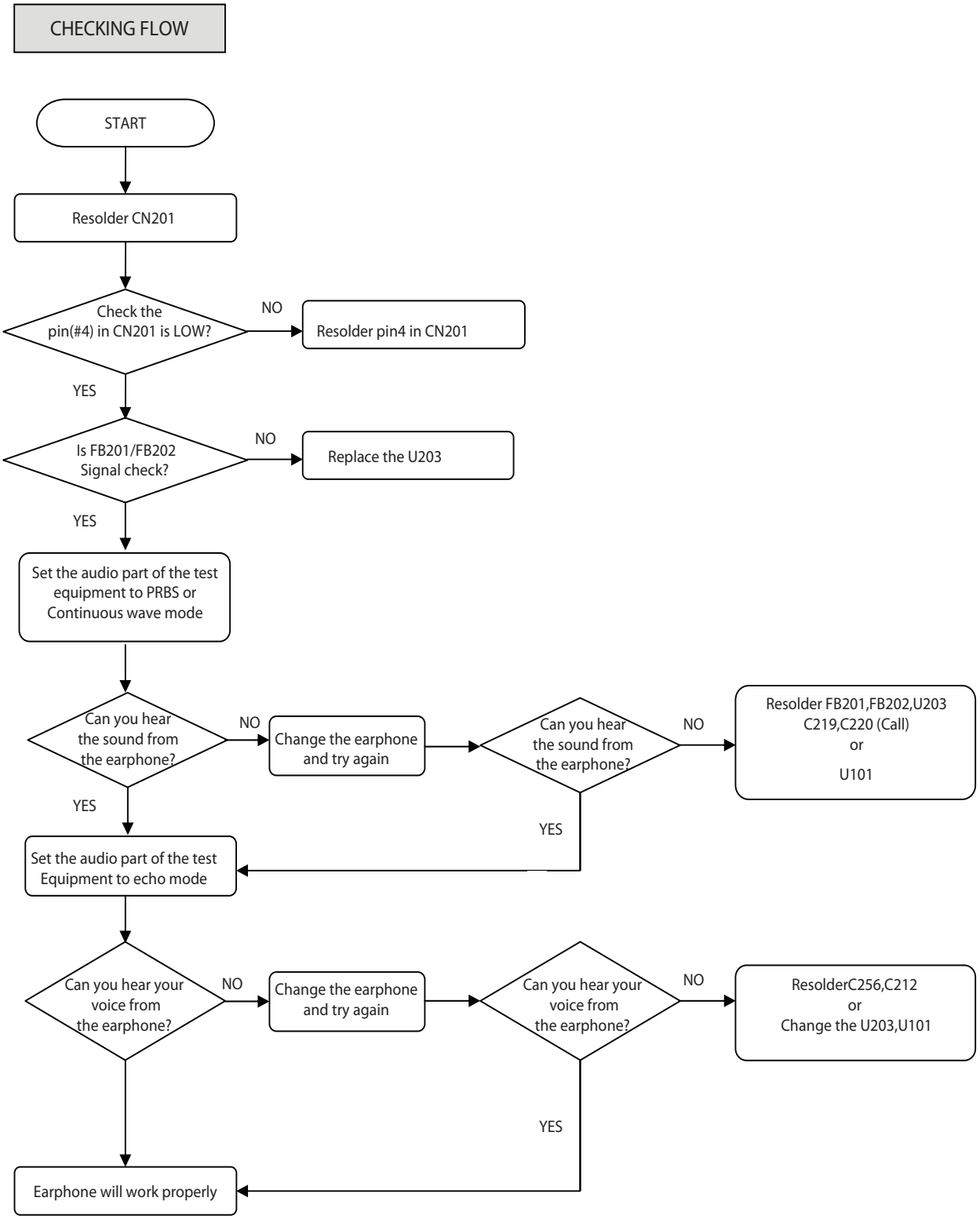
Figure 4.9.1

CIRCUIT



(USB & EAR MIC & TA &UART)





4.10 Microphone Trouble

TEST POINT

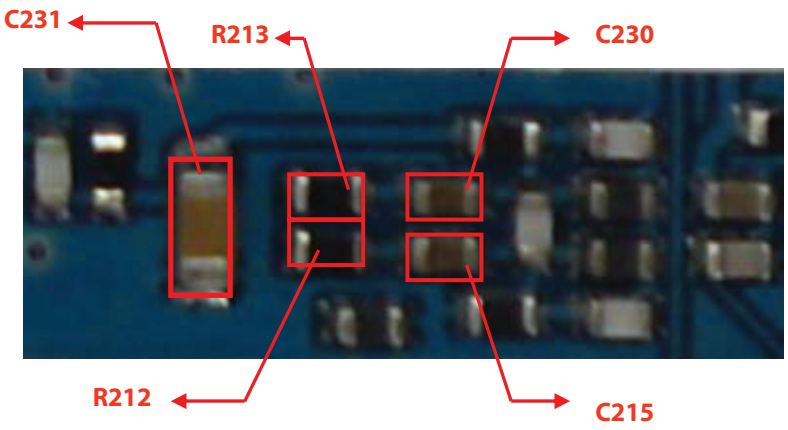
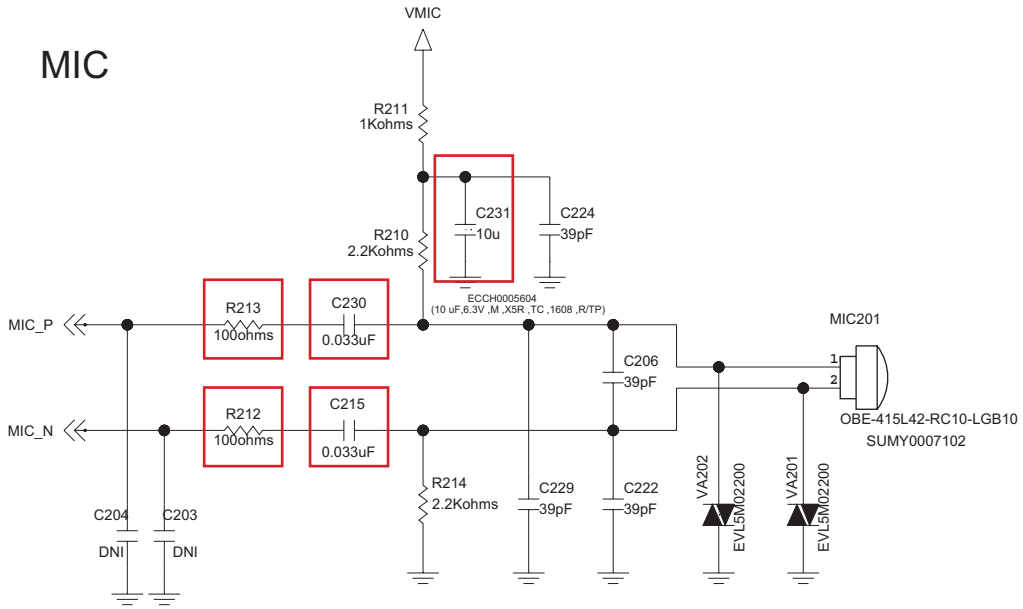


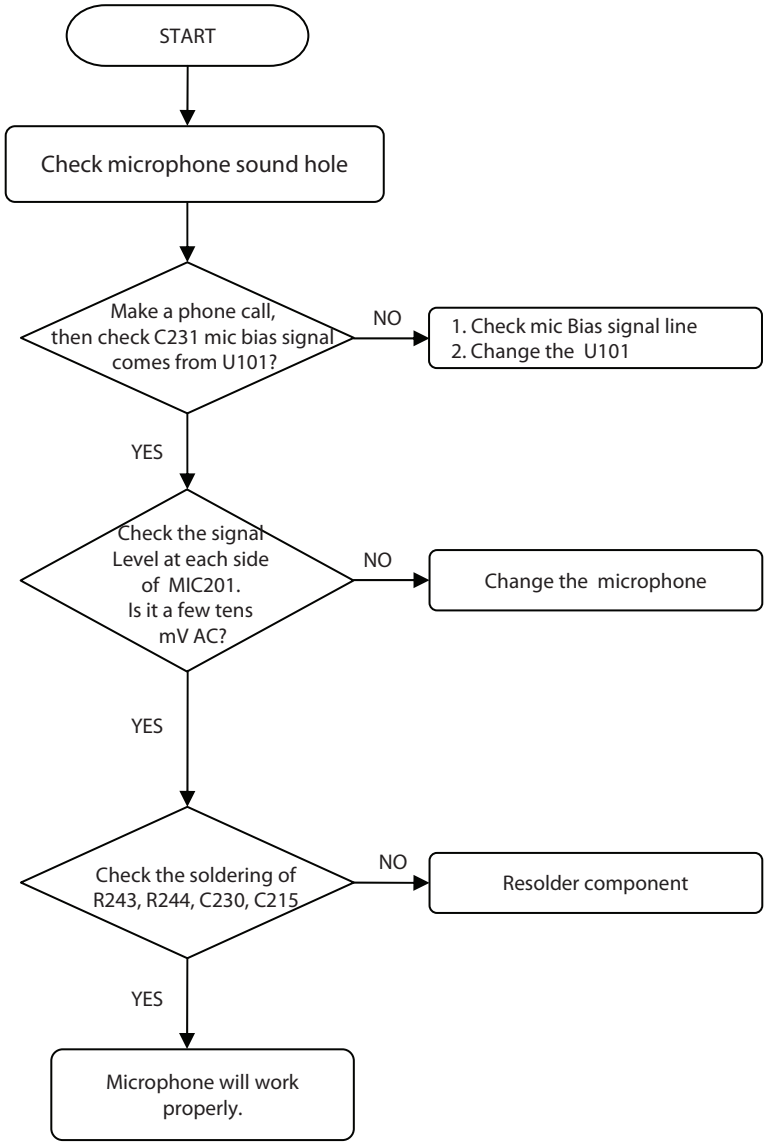
Figure 4.10.1

CIRCUIT



CHECKING FLOW

SETTING : After initialize Agilent 8960, Test EGSM900, DCS mode (or GSM850, PCS mode)



4.11 SIM Card Interface Trouble

TEST POINT

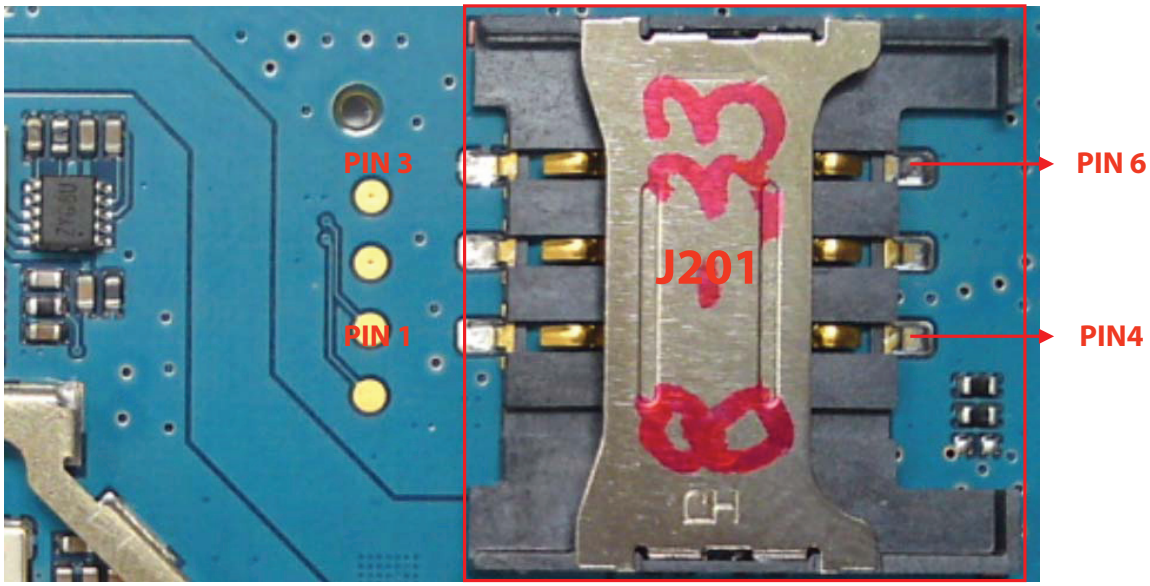
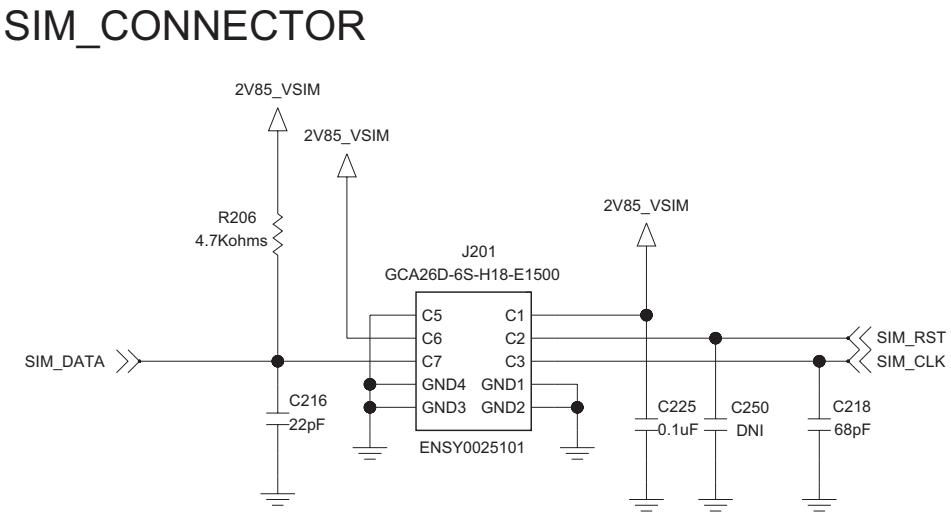
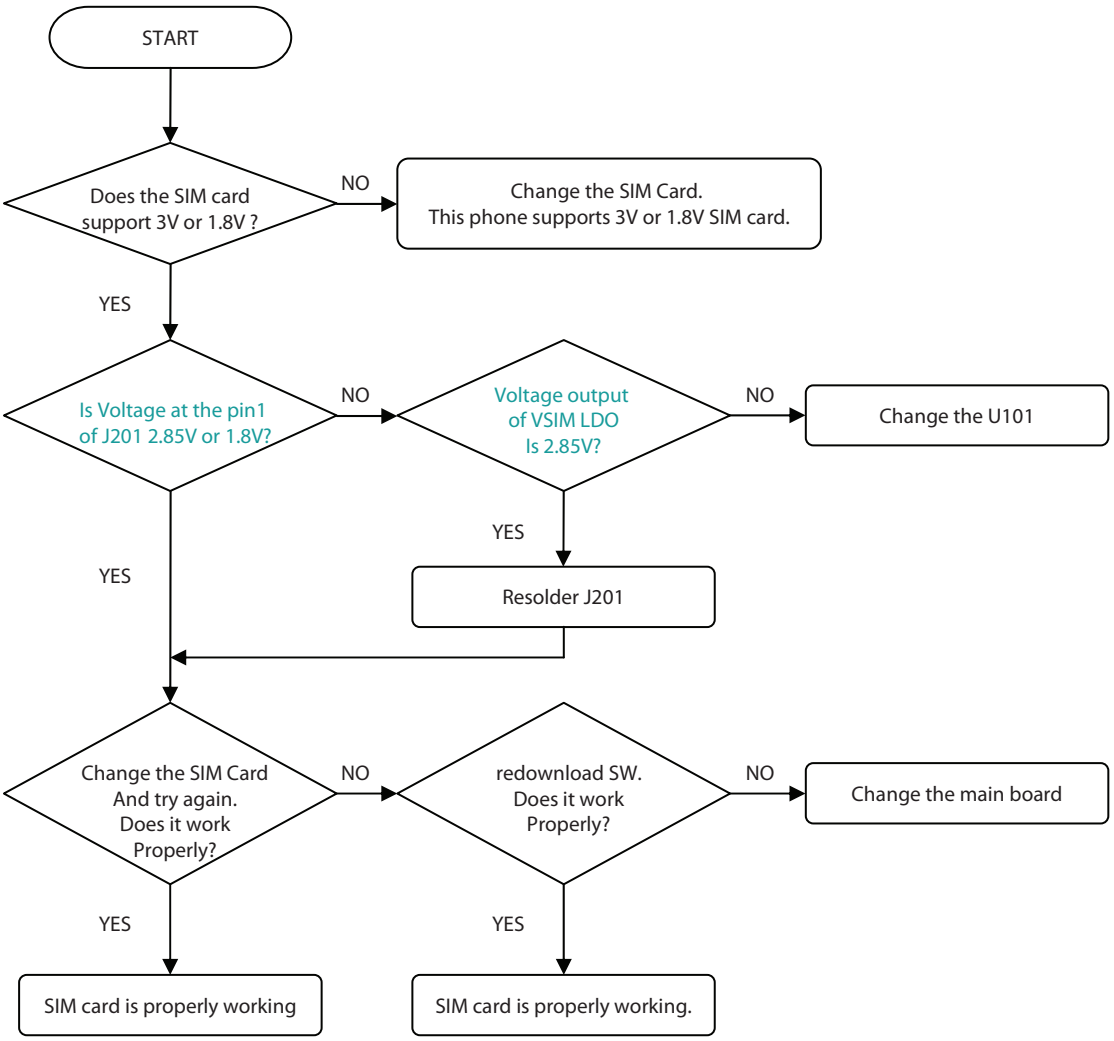


Figure 4.11.1

CIRCUIT



CHECKING FLOW



4.12 KEY backlight Trouble

TEST POINT

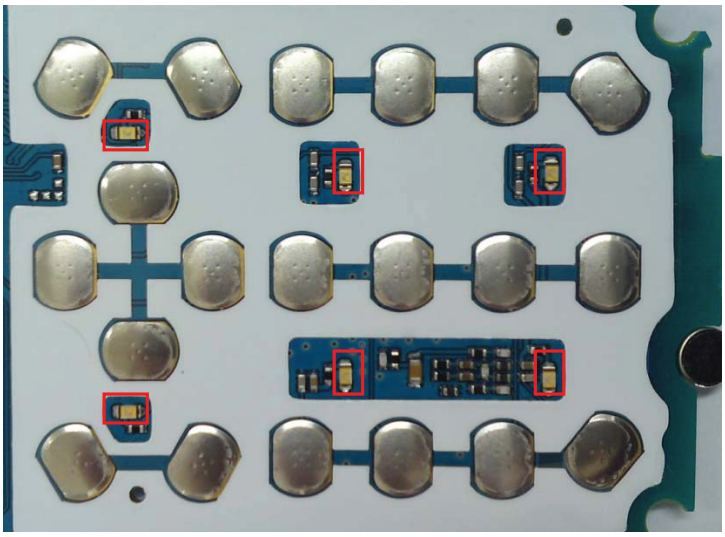
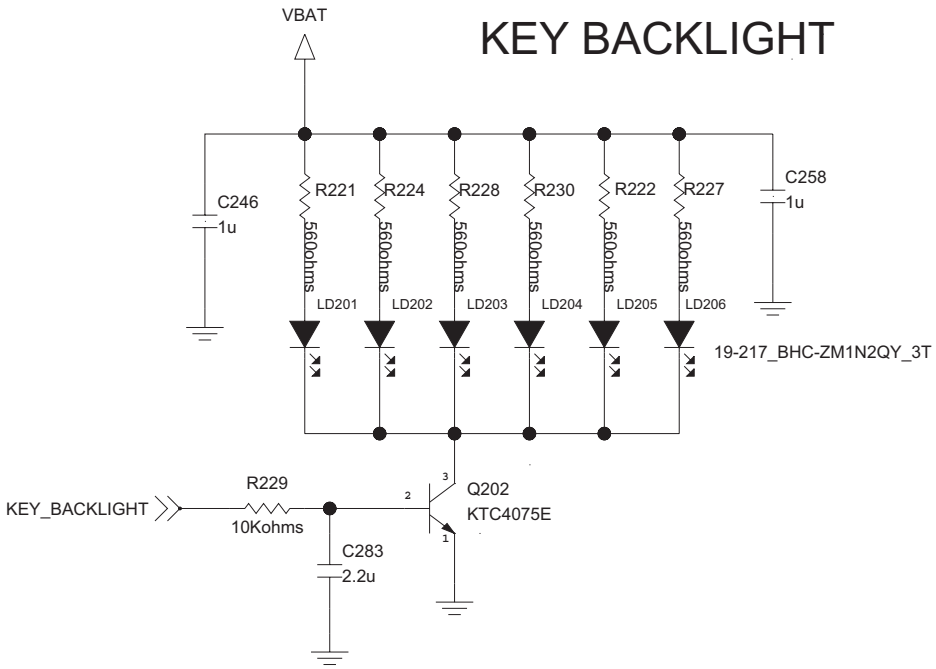
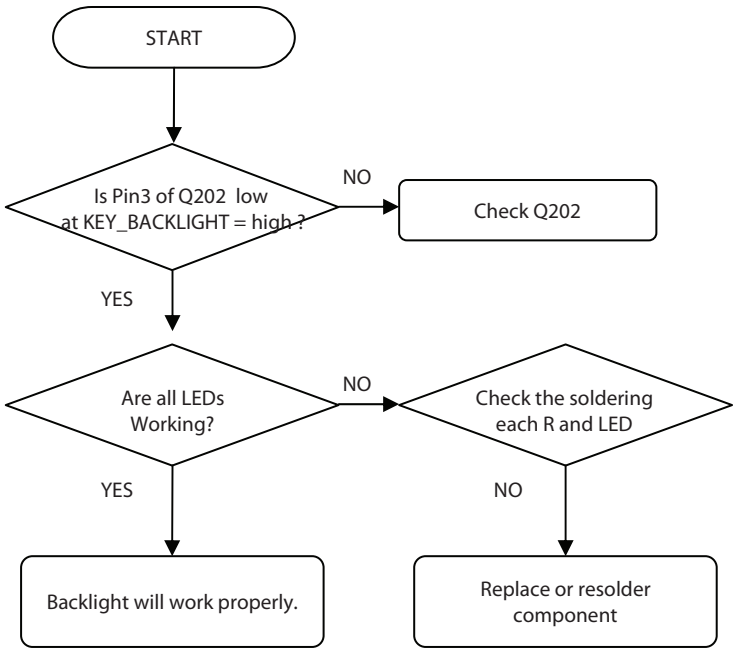


Figure 4.12.1

CIRCUIT

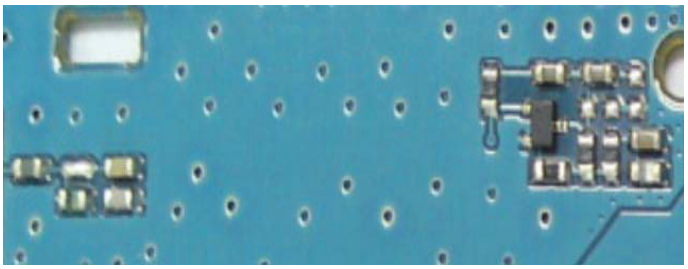


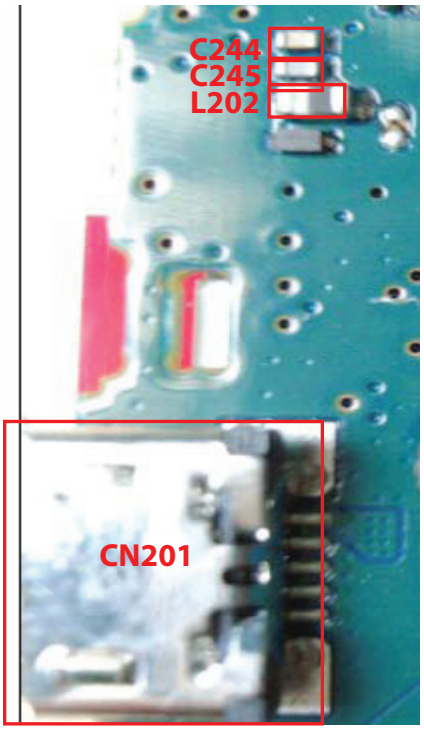
CHECKING FLOW



4.13 FM Radio Trouble

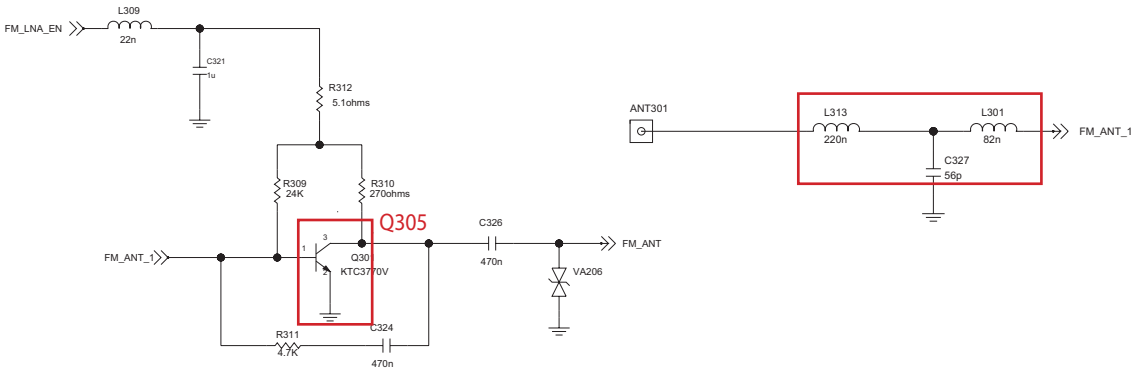
TEST POINT

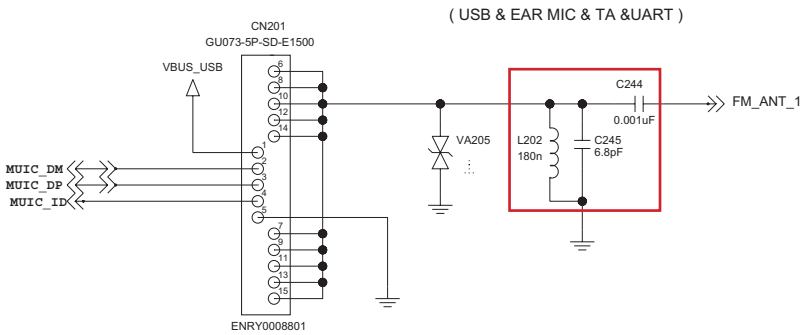




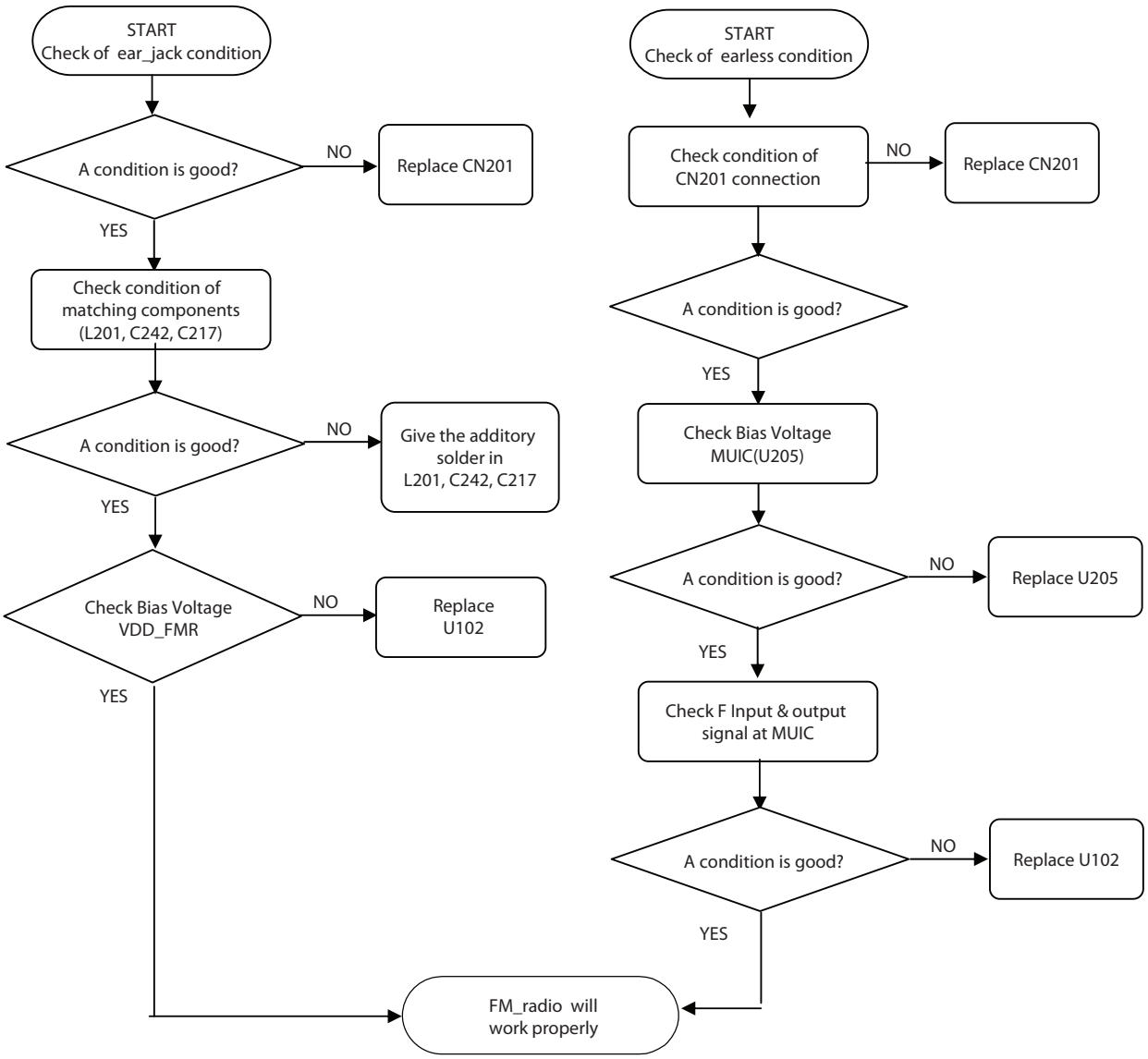
CIRCUIT

FM Radio(LNA)





CHECKING FLOW



5. DOWNLOAD

5.1 S/W Download

Preparation

- Target terminal
- PIF-Union
- RS-232 Cable and PIF-UNION to Phone interface Cable
- Power Supply or Battery
- PC supporting RS-232 with Windows 2000 or newer.

If you are going to use battery, the voltage of the battery should be over 3.7V for stable power supplying during S/W download.

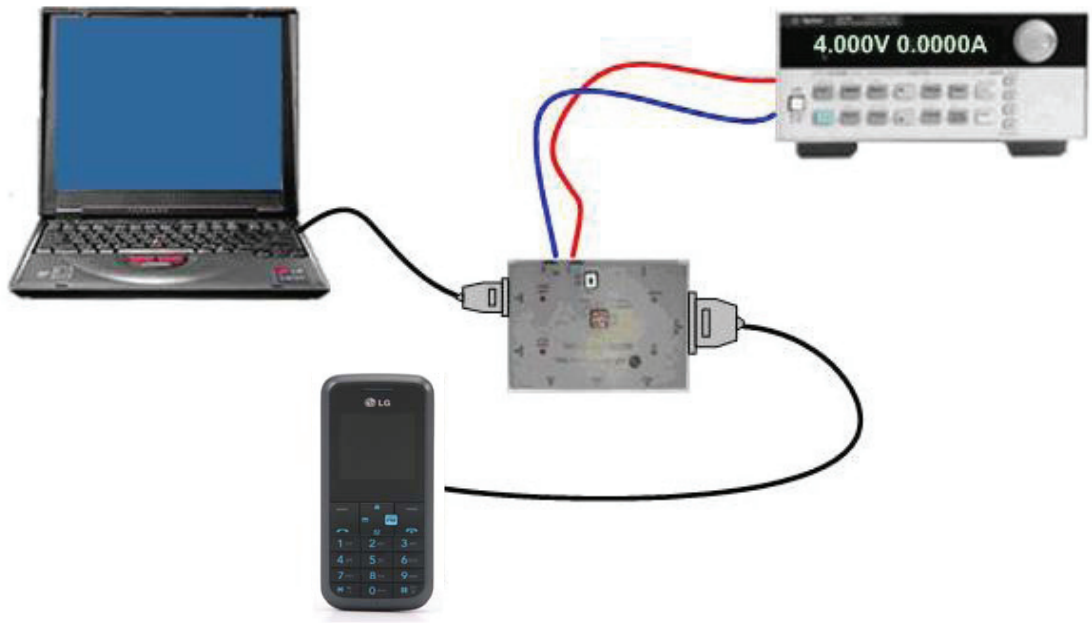
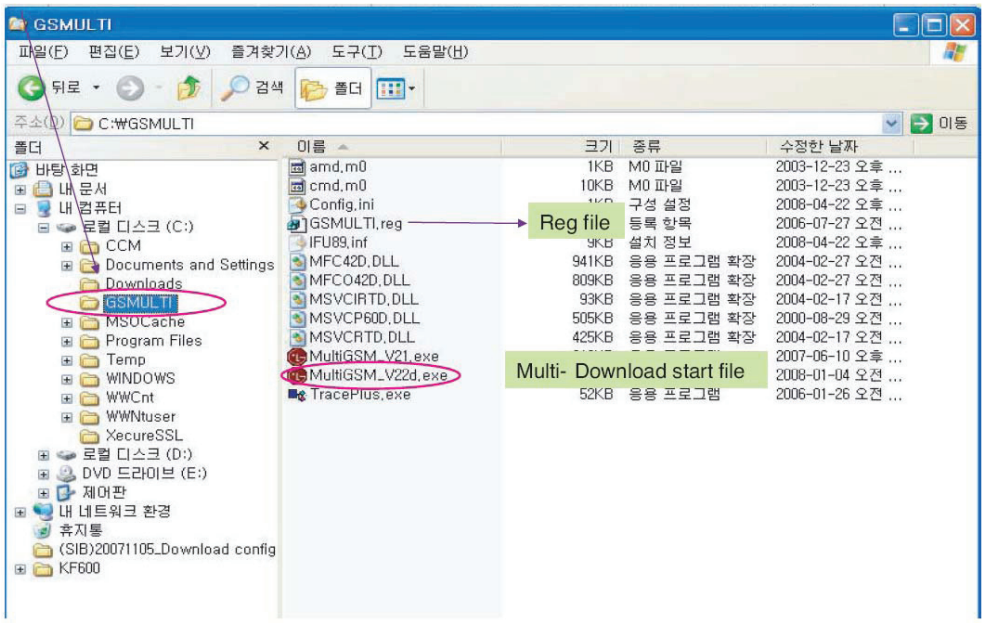


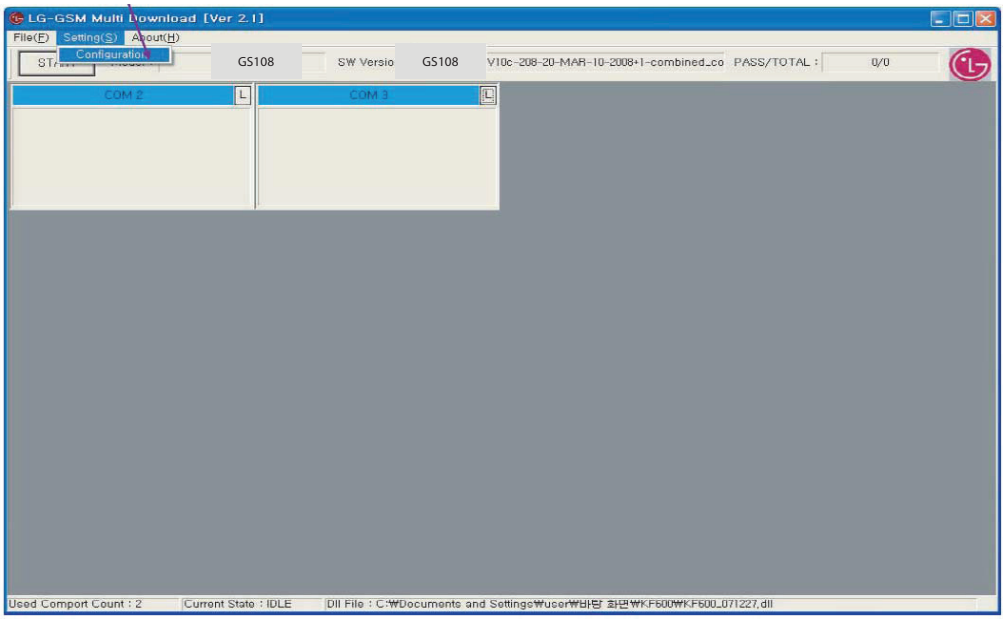
Figure 5.1. S/W download & upgrade setup

5.2 Download program user guide

1. After “GSMULTI” folder copy, paste C:\

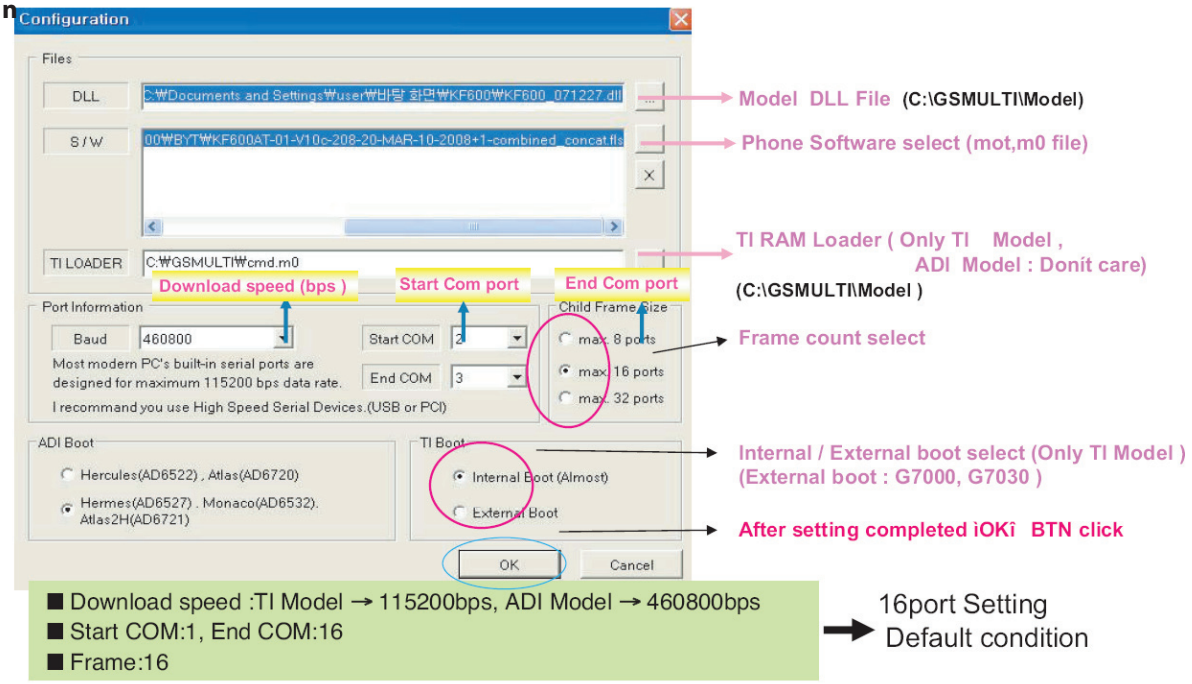


2. “MultiGSM.exe” execution file execute



5.3 Multi-Download Program Setting (Model-Base)

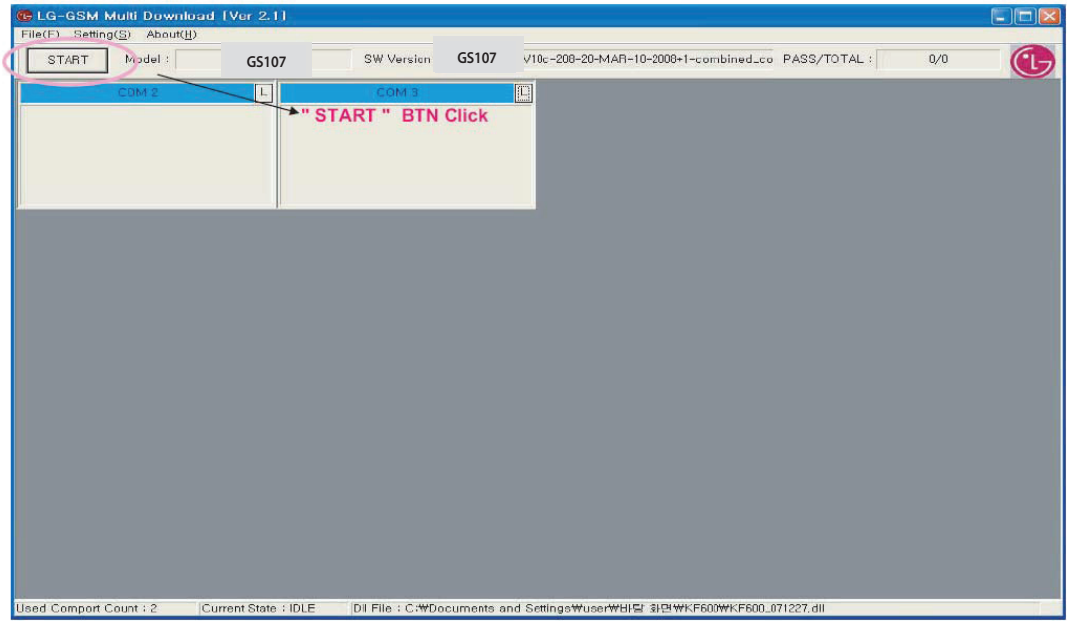
■ Multi-Download Program Execution ? Setting : Configuration



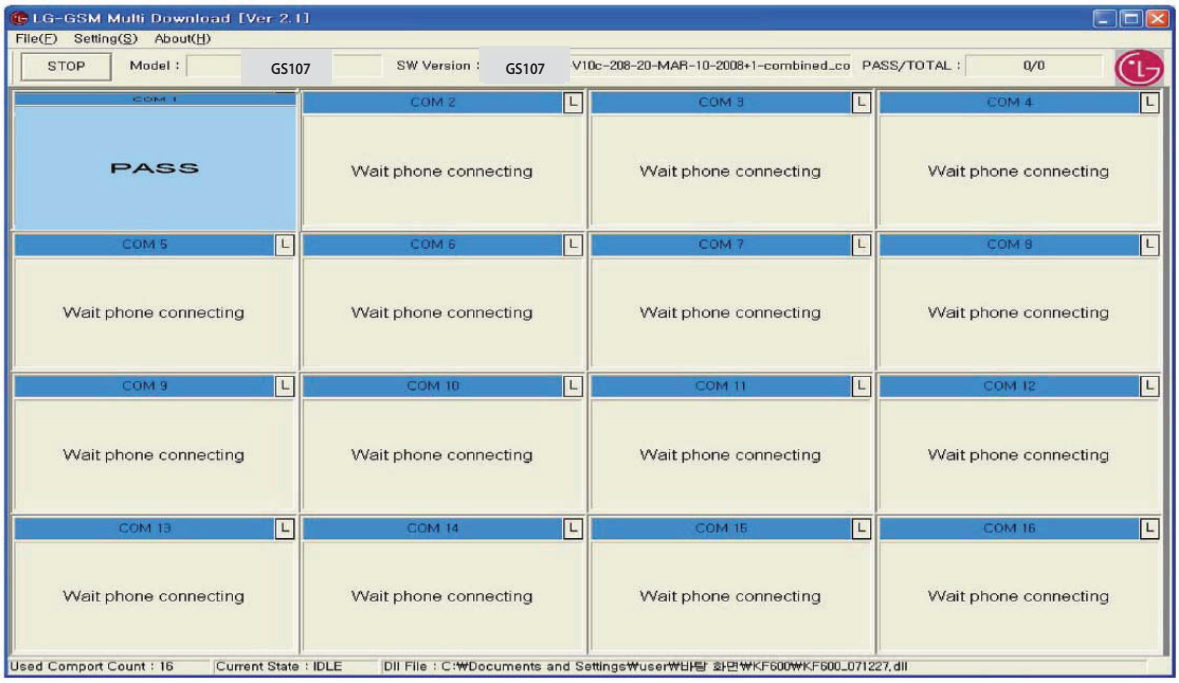
■ Download speed :TI Model → 115200bps, ADI Model → 460800bps
■ Start COM:1, End COM:16
■ Frame:16

→ 16port Setting
Default condition

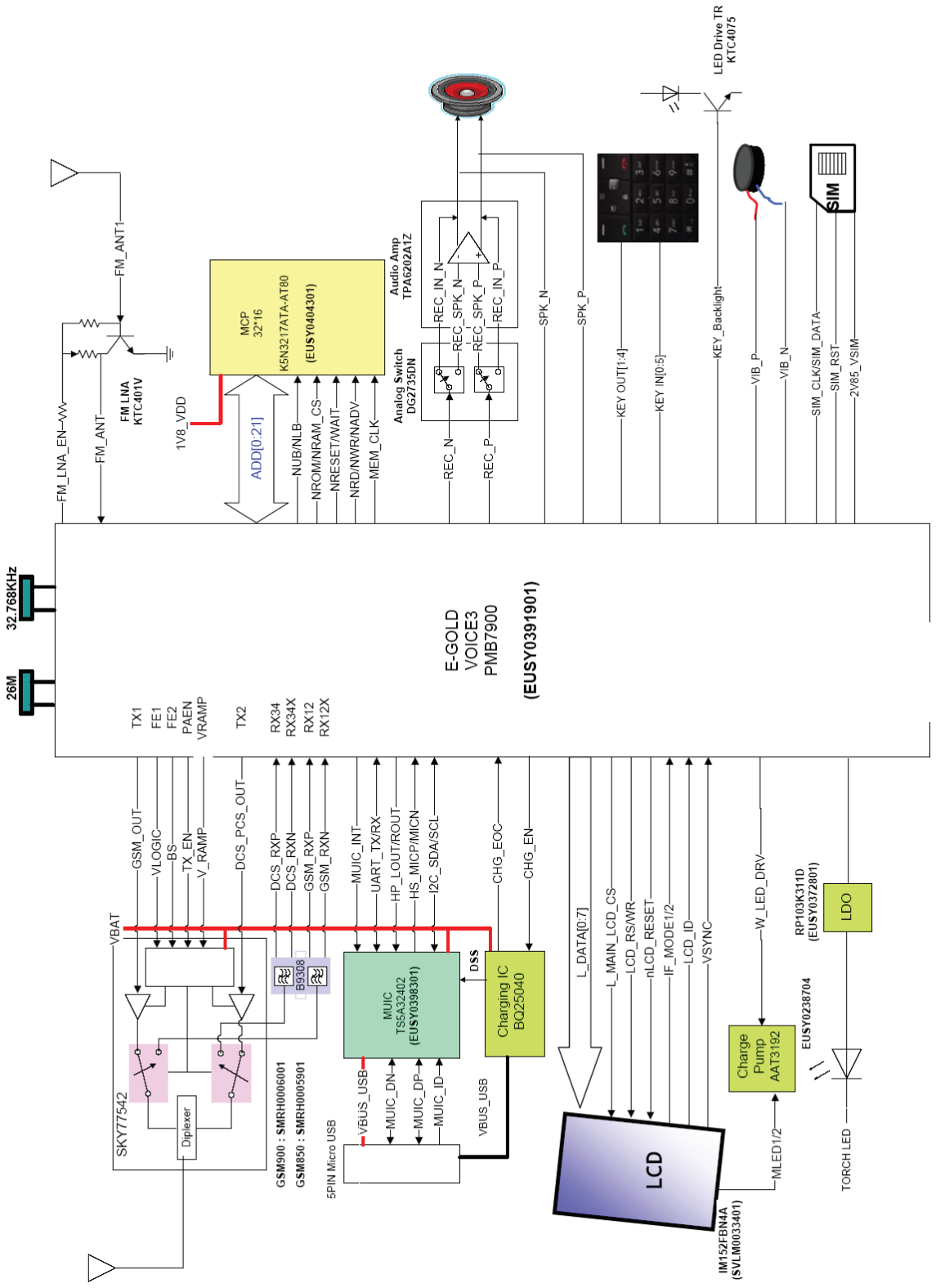
■ Setting Completed



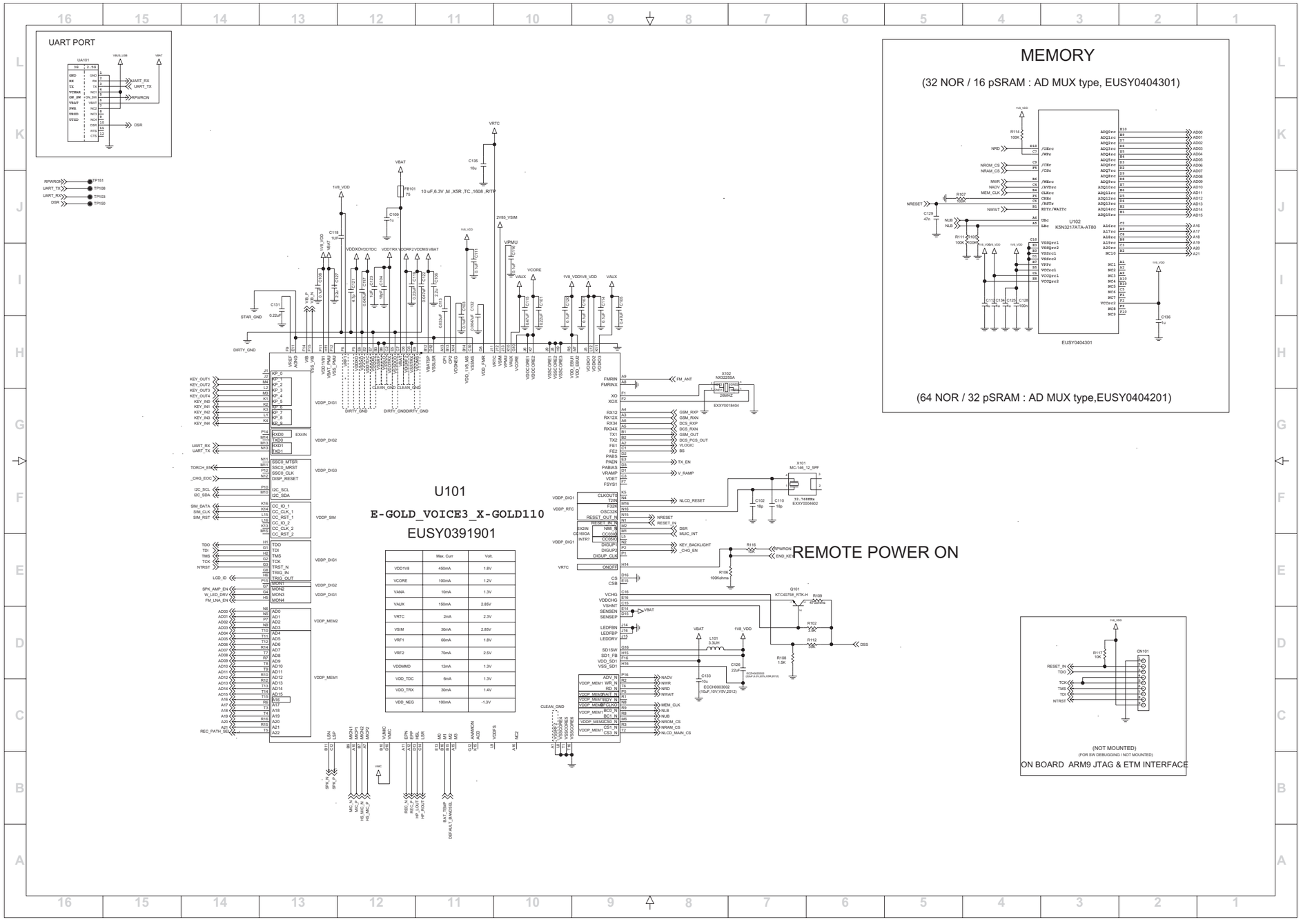
■ Stand-by Condition: “Wait phone connecting” confirm -> Phone connection



6. BLOCK DIAGRAM

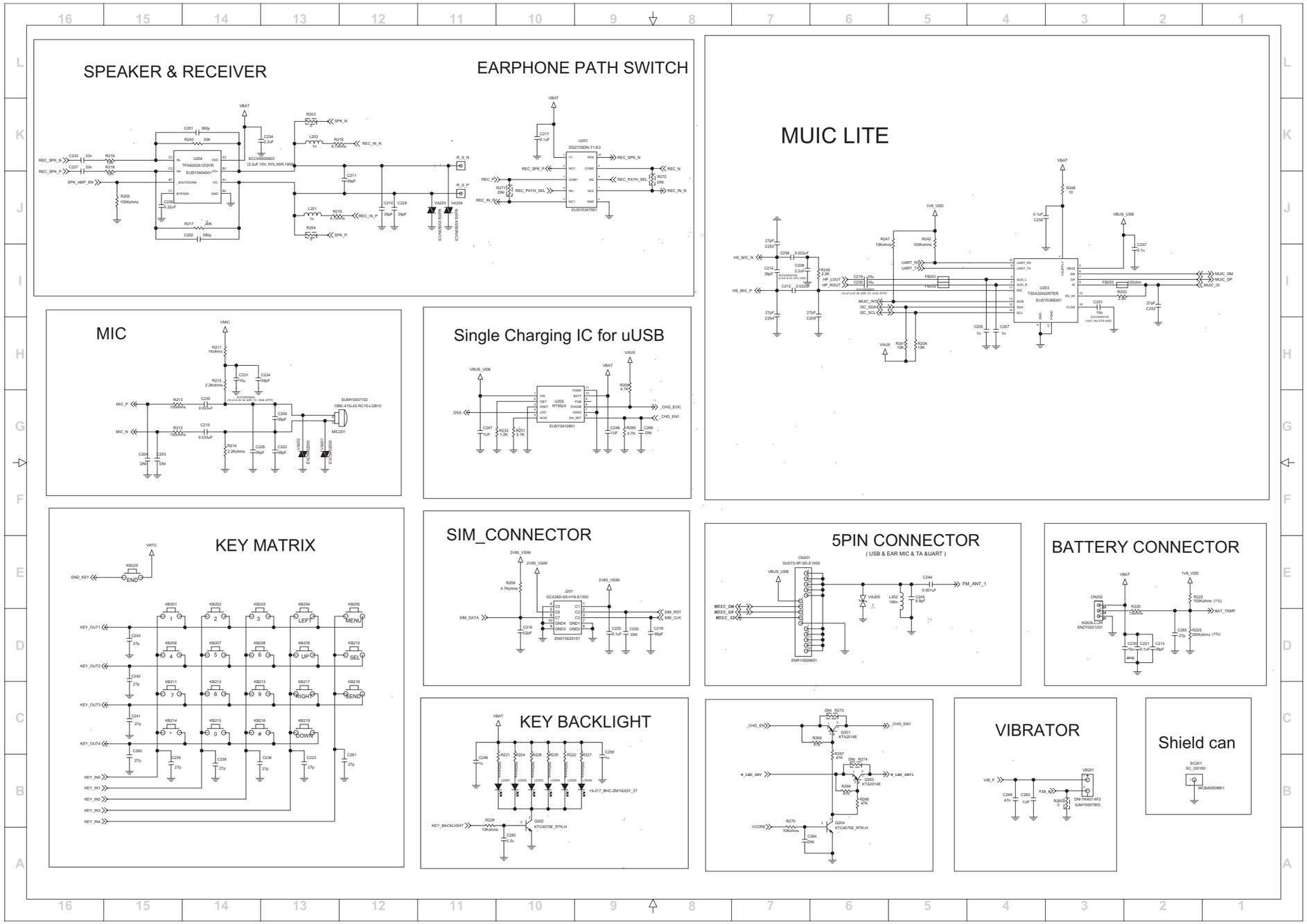


7. CIRCUIT DIAGRAM

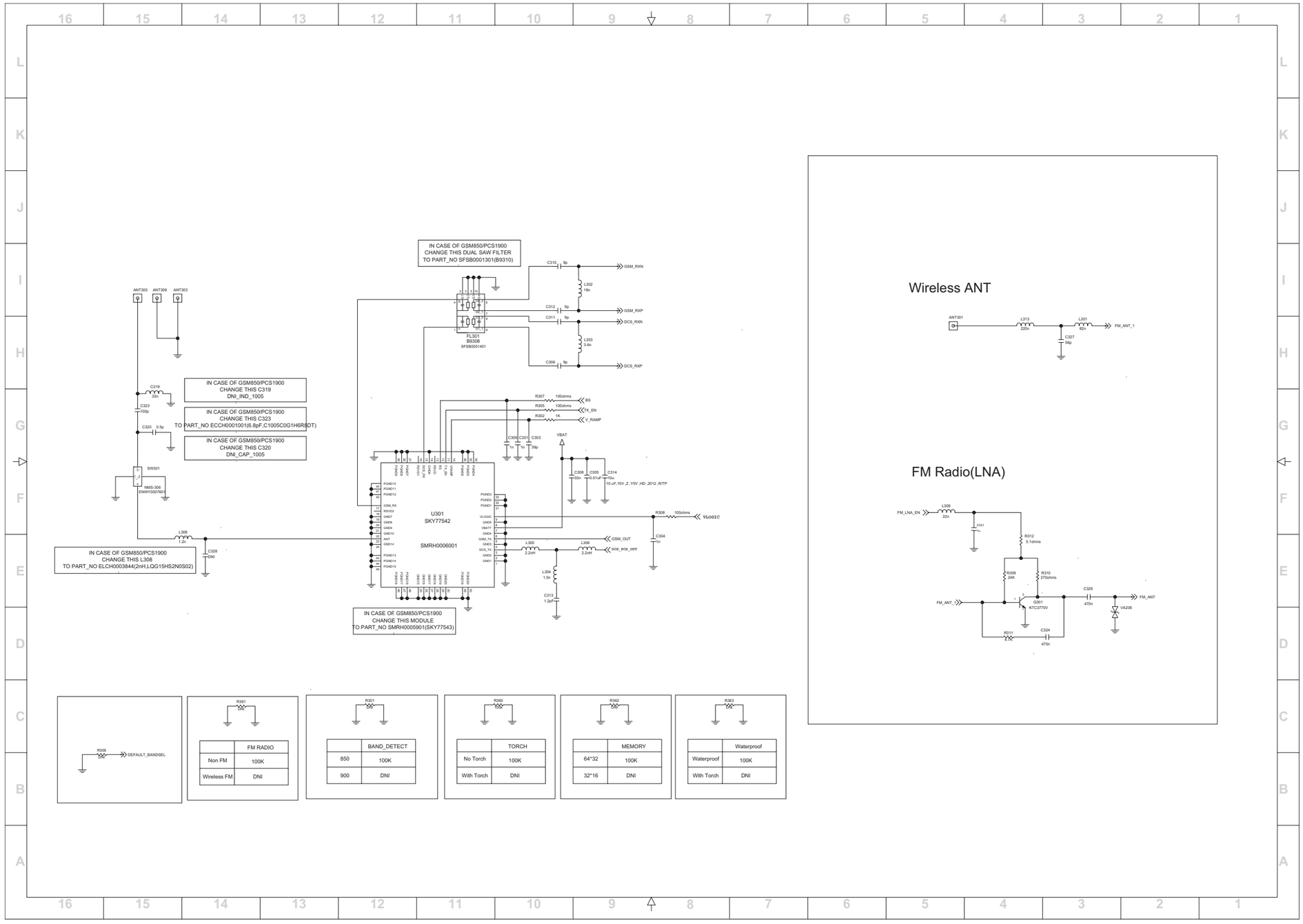


	Max. Curr	Volt.
VDDTV8	450mA	1.8V
VCORE	100mA	1.2V
VANA	10mA	1.3V
VAUX	150mA	2.85V
VRTC	2mA	2.3V
VSIM	30mA	2.85V
VRF1	60mA	1.8V
VRF2	70mA	2.5V
VDDMMD	12mA	1.3V
VDD_TDC	6mA	1.3V
VDD_TRX	30mA	1.4V
VDD_NEG	100mA	-1.3V

7. CIRCUIT DIAGRAM



7. CIRCUIT DIAGRAM



	FM RADIO
Non FM	100K
Wireless FM	DNI

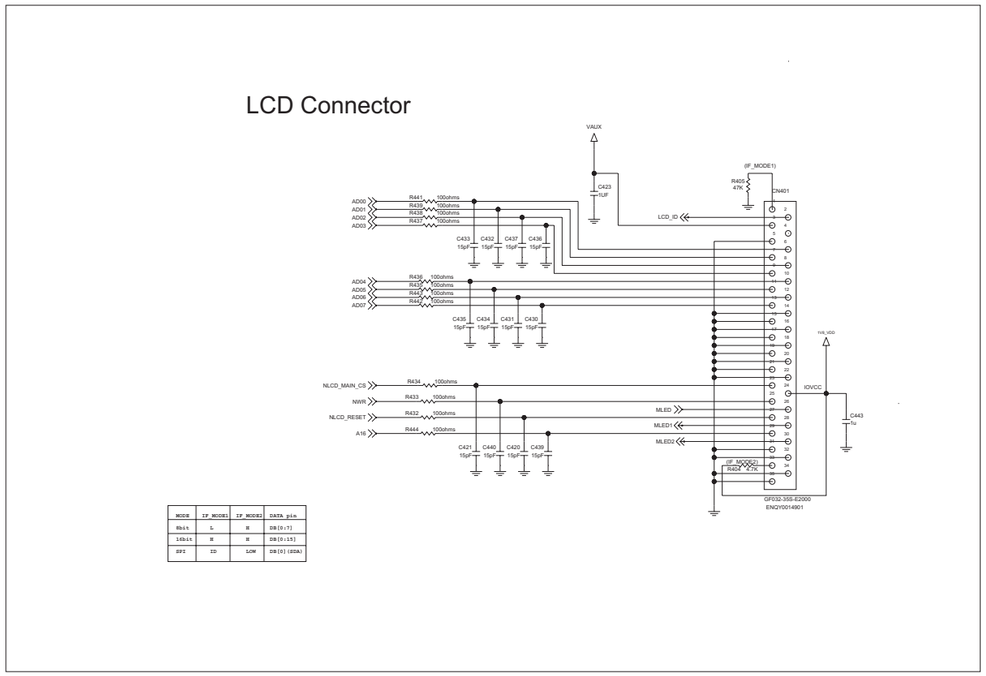
	BAND_DETECT
850	100K
900	DNI

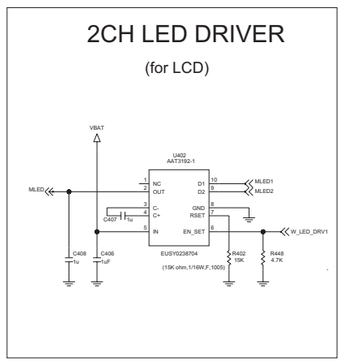
	TORCH
No Torch	100K
With Torch	DNI

	MEMORY
64*32	100K
32*16	DNI

	Waterproof
Waterproof	100K
With Torch	DNI

7. CIRCUIT DIAGRAM





8. BGA Pin Map

▪ **Ball Diagram (Top View), PMB7900(E-GOLDVoice 3)**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
A	VSSRF2	FE1	RX12X	RX12	RX34X	RX34	MICP2	FMRINX	FMRIN	MICP1	EPN	EPP	CP1	VDDNEG	M3	NC2	A
B	TX1	TX2	VSSRF			VSSLO	MICN2		MICN1	VUMIC	LSN	VBATSP	CP2	VDD_1V8_MS	M2	M1	B
C	FE2	VDDTRX	VDET			VSSTRX	VBAT			VSSMS		LSP		HSR	VSHNT	VCHG	C
D	VRAMP	PABS	PABIAS			VDDRF2		VDD_FMR		VMIC		VSSLSR	HSL		SENSEP	CS	D
E		VDDTDC	PAEN		VSSDCO	VSSXO	VSSDIG		VDDMS		AGND		M0	SENSEN	CSB	VDDCHG	E
F	XO	XOX			VDDXO	VRF1	FSYS1		VREF		VDD1V81	VSS_PMU		VIB	VSS_VIB	VDD_SD1	F
G	TDI	TCK	TRST_N	MON3			MON2	TRIG_IN		VCORE		ANAMON				SD1SW	G
H	TDO	TMS			MON4	TRIG_OUT			VSSCORE3		VBAT_PMU			ONOFF	SD1_FB	VSS_SD1	H
J	KP_0	KP_1			VDDIO1	VDDCORE1		VSSCORE2	VSSCORE1		VRTC	VSIM	VPMU	LEDFBN	LEDDRV	LEDFBP	J
K	KP_5	KP_6	KP_7	KP_9	CLKOUT0		VDDCORE2			VAUX	VDDIO3		CC_CLK_2	CC_CLK_1	ACD	CC_IO_1	K
L	KP_8	KP_3			CC05IO			VSSCORE4	VDDFS			VDDIO2			CC_RST_1	CC_IO_2	L
M	CC03IO	NMI_N	KP_4	KP_2		CS0_N	VDD_EBU2			I2C_SDA	SSC0_MRST		RXD1	TXD0	CC_RST_2	F32K	M
N	RESET_IN_N	DIGUP1		T2IN	AD1	AD0		BFCLKO	AD3		SSC0_MTSR	DISP_RESET	TXD1		RESET_OUT_N	OSC32K	N
P	DIGUP_CLK	DIGUP2			WAIT_N		AD2			I2C_SCL		SSC0_CLK		RXD0	MON1	ADV_N	P
R	RDY_N	WR_N	CS1_N		VDD_EBU1	A17	AD9	BC1_N	BC0_N	AD12		AD13		AD7	A21	A20	R
T	VSSCORE5	CS3_N	A18	A19	A22	RD_N	AD8	AD10	AD11	AD4	AD5	AD6	AD14	AD15	A16	VSSCORE6	T
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	

Use
Not

8. BGA Pin Map

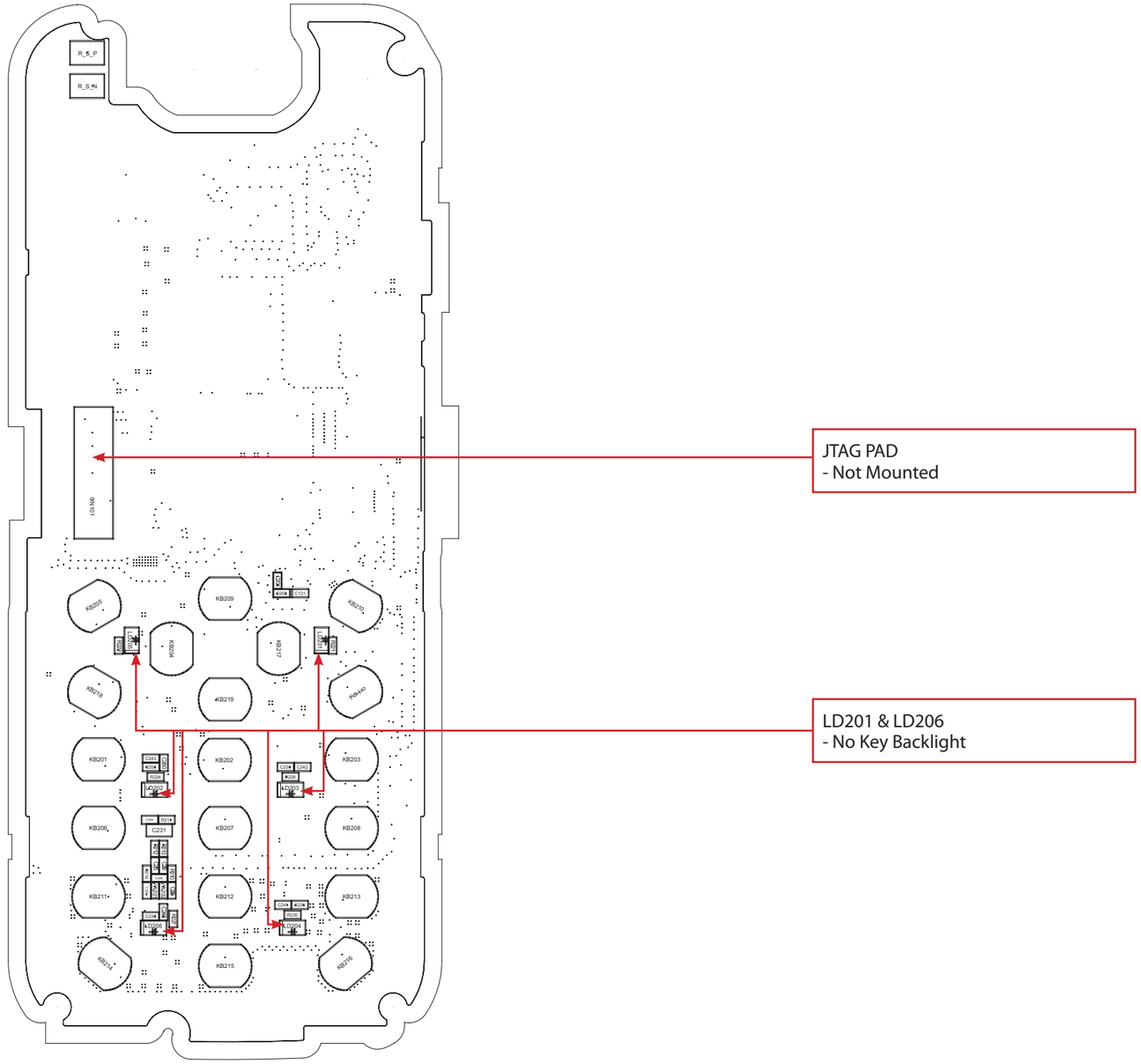
▪ **Ball Diagram (Top View), K5N6433ATM**

	1	2	3	4	5	6	7	8	9	10
A	NC	NC			/LBc	/UBc			NC	NC
B	RDYr/ WAITc	A21r	VSSrc	CLKrc	VDDrc	/WErc	VPPr	A19rc	A17rc	NC
C	VDDQrc	A16rc	A20rc	/AVDrc	NC	/RSTr	/WPr	A18rc	/OEr	VSSQrc
D	VSSrc	ADQ7rc	ADQ6rc	ADQ13rc	ADQ12rc	ADQ3rc	ADQ2rc	ADQ9rc	ADQ8rc	/OErc
E	ADQ15rc	ADQ14rc	VSSQrc	ADQ5rc	ADQ4rc	ADQ11rc	ADQ10rc	VDDQrc	ADQ1rc	ADQ0rc
F	NC	VDDrc			/CSc	CREc			NC	NC

52 FBGA: Top View (Ball Down)

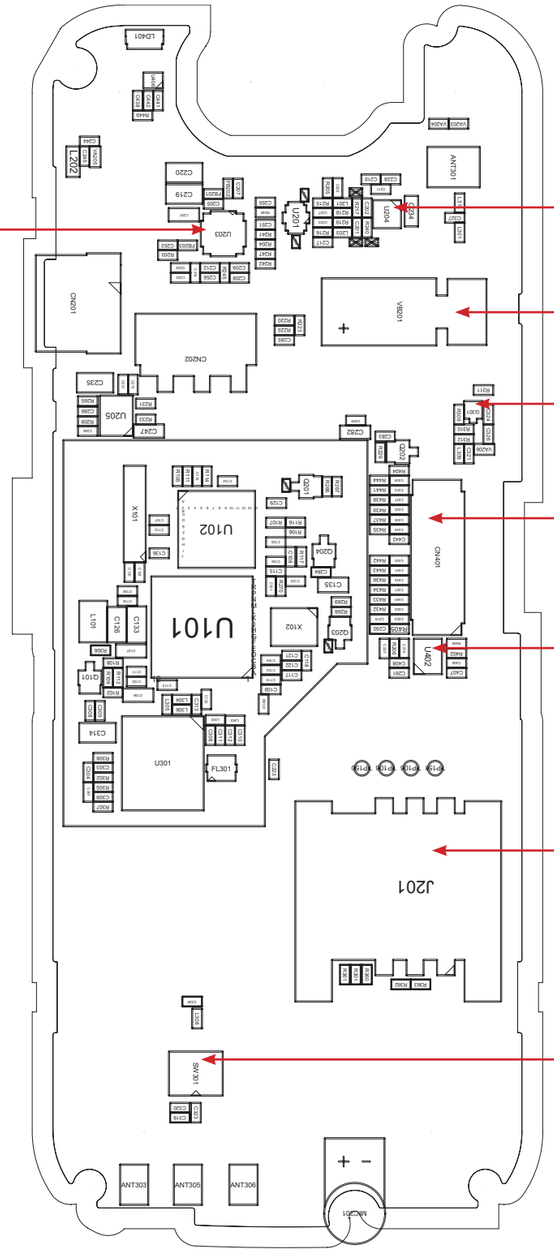
Use
Not

9. PCB LAYOUT



GS107 -MAIN-SPFY0212101-1.1-TOP

9. PCB LAYOUT



U205 (MUIC)
No Earphone
-No Download

U204(Audio Amp)
The Audio working bad

VB201
No Vibration

Q301(FM Radio LNA)
- FM Radio noise

CN401(LCD Connector)
- No LCD Display

U402(LCD Charge Pump)
No LCD Backlight

J201
No SIM

SW301(mobile switch)
- Can't make a call
Tx Low power
Not good BER
No Service

GS107 -MAIN-SPFY0212101-1.1-TOP

10.ENGINEERING MODE

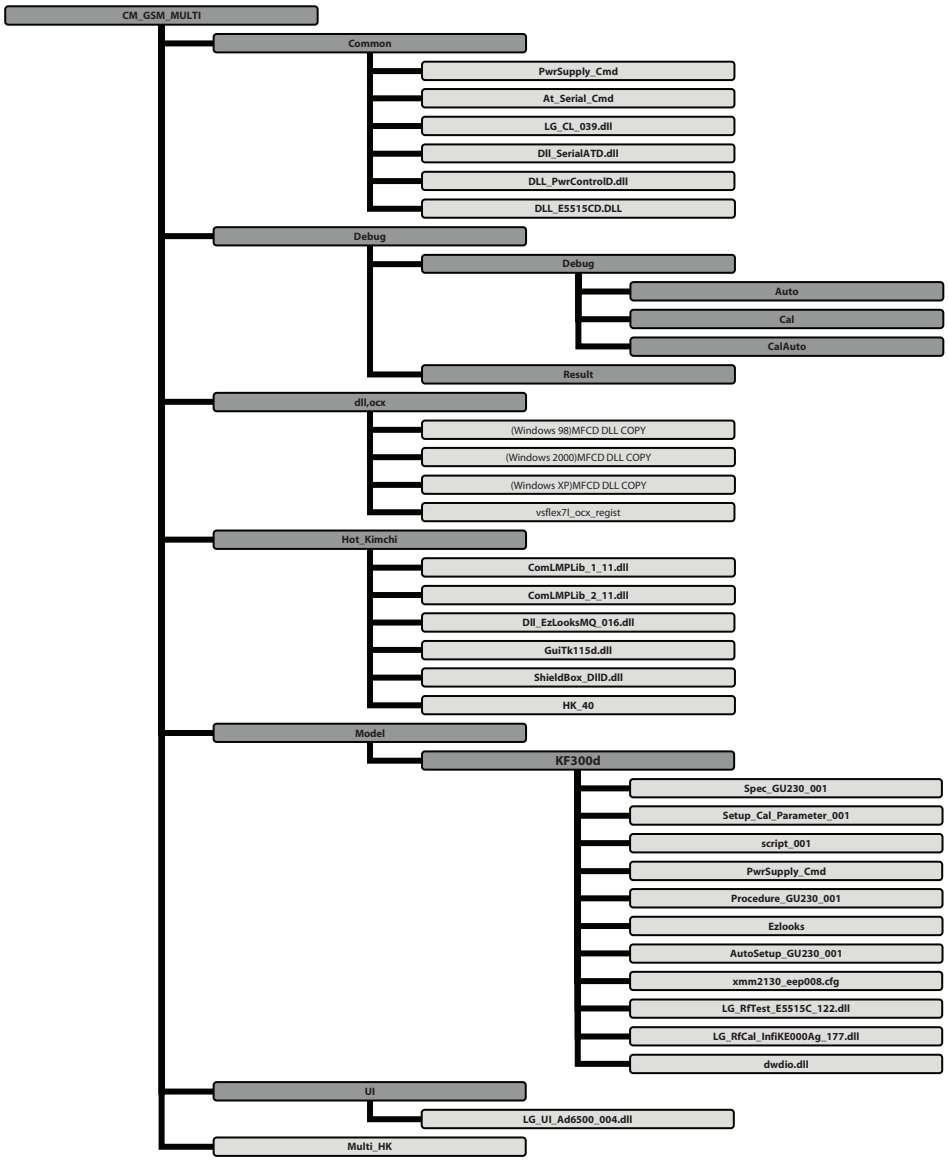
Engineering mode is designed to allow a service man/engineer to view and test the basic functions provided by a handset. The key sequence for switching the engineering mode on is “1809#*108# “Select. Pressing END will switch back to non-engineering mode operation. Use Up and Down key to select a menu and press ‘select’ key to progress the test. Pressing ‘back key will switch back to the original test menu.

11. AUTO CALIBRATION

11.1 Overview

Auto-cal (Auto Calibration) is the PC side Calibration tool that perform Tx, Rx and Battery Calibration with Agilent 8960(GSM call setting instrument) and Tektronix PS2521G(Programmable Power supply).
Auto-cal generates calibration data by communicating with phone and measuring equipment then write it into calibration data block of flash memory in GSM phone.

11.2 Configuration of HotKimchi



11.3 Description of Basic File.

1. Common

-. **LG_CL_039.dll** : Common logic dll, Module In Charge of Reading PID & S/W Version, Booting.
-. **Dll_SerialATD.dll** : Serial Communication Module From Phone by AT Command.
-. **DLL_PwrControlD.dll** : Communication Module From Power supply.
-. **DLL_E5515CD.DLL** : Communication Module From Agilent 8960(Test Set).
-. **At_Serial_Cmd.xml** : Definition File of AT Command.
-. **PwrSupply_Cmd.xml** : Definition File of Power supply command.

2. Debug

-. **Debug** - Cal : Result File of Calibration.
Auto : Result File of Auto Test.
CalAuto : Result File of Cal & Auto Test.

3. dll, ocx

-. **vsflex7l_ocx_regist :** Registration File for System use

-. **Windows XXX)MFCD DLL :** Registration File for System use

4. HotKimchi

-. **HK_40.exe** : Execute File, HK_XX → XX is File Version.
-. **ComLMPLib_1_11.dll** : Communication Module With PLC or Shield Box In Automation Rack.
Support to J&S Shield Box and Tescom TC-5981A.
-. **ComLMPLib_2_11.dll** : Communication Module With PLC or Shield Box In Automation Rack.
Support to J&S Shield Box and Tescom TC-5981A.
-. **Dll_EzLooksMQ_005.dll** : Communication Module with ezTray Installed In Local PC.
-. **GuiTk115d.dll** : control library
-. **ShieldBox_DllD.dll** : Communication with Shield Box. Support to Tescom TC-5952B.

5. Model

-. **LG_RfCal_InfiKE000Ag_177.dll** : Main Module of Calibration
-. **LG_RfTest_E5515C_122.dll** : Main Module of Auto Test
-. **Xmm2130_eep008.cfg** : Cal Data Save binary Module.
-. **AutoSetup_GU230_100.xml** : RF TEST Setup Module.
-. **Ezlooks.xml** : Calibration ezLooks Item & Cal Spec Definition Module.
-. **Procedure_GU230_001.xml** : RF TEST Procedure Definition Module.
-. **Script_001.xml** : RF TEST Setup & calibration Setup Module.
-. **Spec_GU230_001.xml** : Definition Module of Auto Test Spec
-. **Setup_Cal_Parameter_001.xml** : Calibration Definition Module.

6. UI

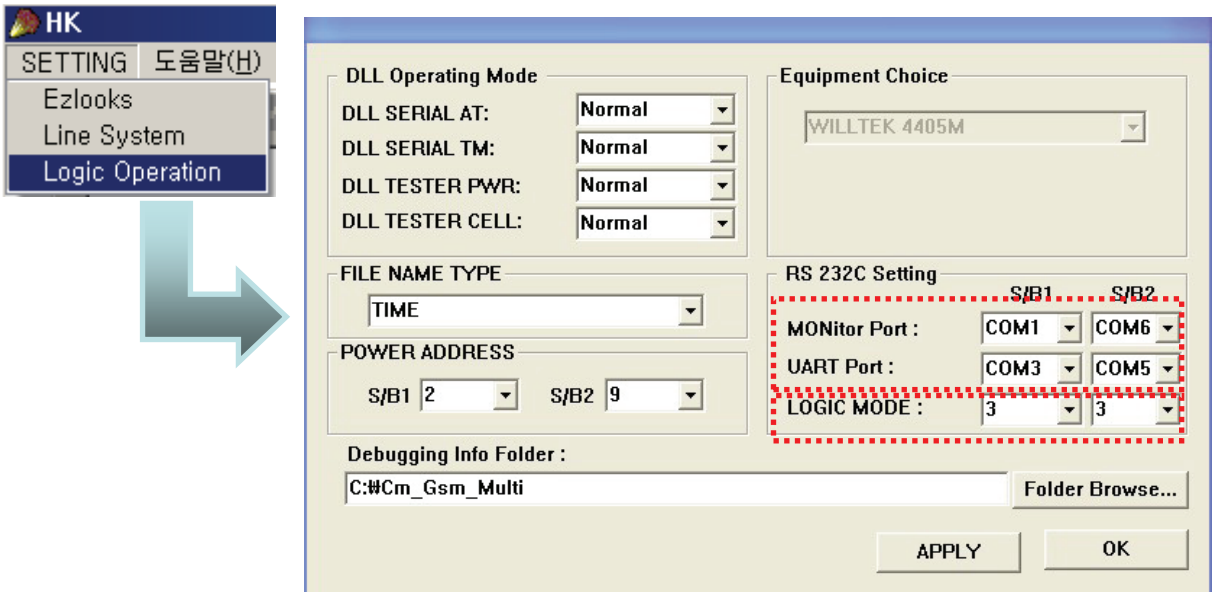
-. LG_UI_Ad6500_002.dll : ADI Model UI Dll.

7. Multi_HK

1. Connect as Fig 6-2(RS232 serial cable is connected between COM port of PC and MON port of TEST JIG, in general)
2. Set the Power Supply 4.0V
3. Set the 3rd, 4th of DIP SW ON state always
4. Press the Phone power key, if the Remote ON is used, 1st ON state

11.4 Procedure

1. Copy the file to C:\Cm_Gsm_Multi
2. Copy the files of((Windows XXX)MFCD DLL, vsflex7l_ocx_regist to C:\Cm_Gsm_Multi\dll,ocx
3. Select MFCD DLL of your computer OS
4. Click on “vsflex7l_ocx_regist”
5. Click on “Multi_HK reg”
6. Connect as Fig 11-2 (RS232 serial cable is connected between COM port of PC, in general.)
7. Run *HK_40exe* to start calibration.
8. Click “ Logic Operation” of “SETTING” menu bar



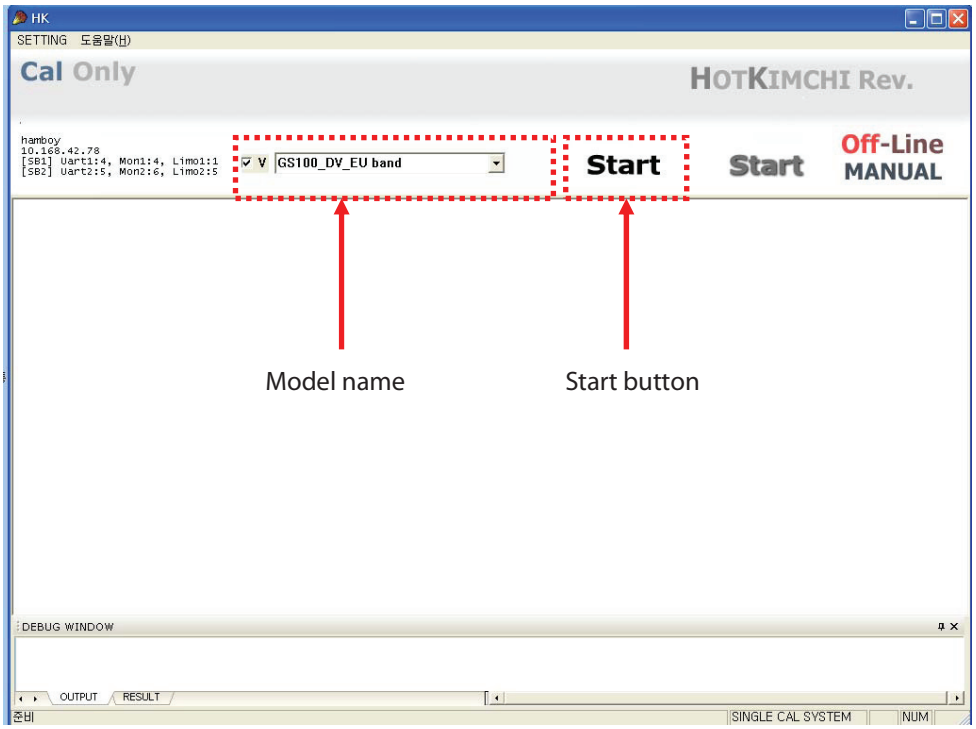
9. Set PORT (using RS232 cable) that PC can communicate with the phone

10. Select " LOGIC MODE" that you want

Logic mode: 1-> Calibration only
2-> Auto test only
3-> Cal & Auto

11. AUTO CALIBRATION

11. Select the model name " GS107 "



12. Click "start" button

11.5 AGC

This procedure is for Rx calibration.
In this procedure, We can get RSSI correction value. Set band EGSM and press Start button the result window will show correction values per every power level and gain code and the same measure is performed per every frequency.

11.6 APC

This procedure is for Tx calibration.
In this procedure you can get proper scale factor value and measured power level.

11.7 ADC

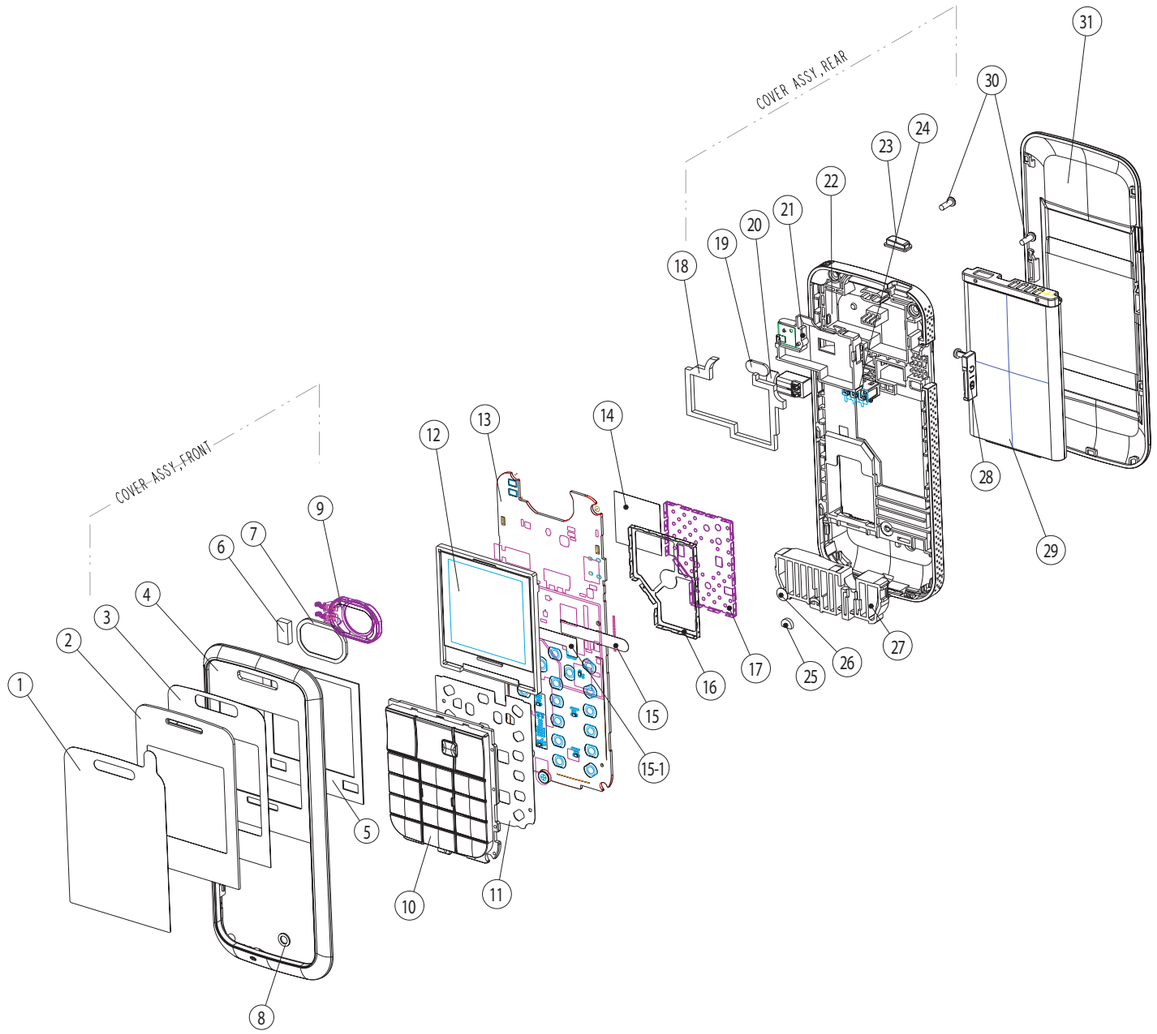
This procedure is for battery calibration.
You can get main Battery Config Table and temperature Config Table will be reset.

11.8 Target Power

BAND	Description	Low	Middle	High
GSM 850	Channel	128	191	251
	Frequency	824.2 MHz	836.8 MHz	848.8 MHz
	Max power	32.5 dBm	32.5 dBm	32.5 dBm
EGSM 900	Channel	975	37	124
	Frequency	880.2 MHz	897.4 MHz	914.8 MHz
	Max power	32.5 dBm	32.5 dBm	32.5 dBm
DCS1800	Channel	512	699	885
	Frequency	1710.2 MHz	1747.6 MHz	1784.8 MHz
	Max power	29.5 dBm	29.5 dBm	29.5 dBm
PCS 1900	Channel	512	661	810
	Frequency	1850.2 MHz	1880 MHz	1909.8 MHz
	Max power	29.5 dBm	29.5 dBm	29.5 dBm

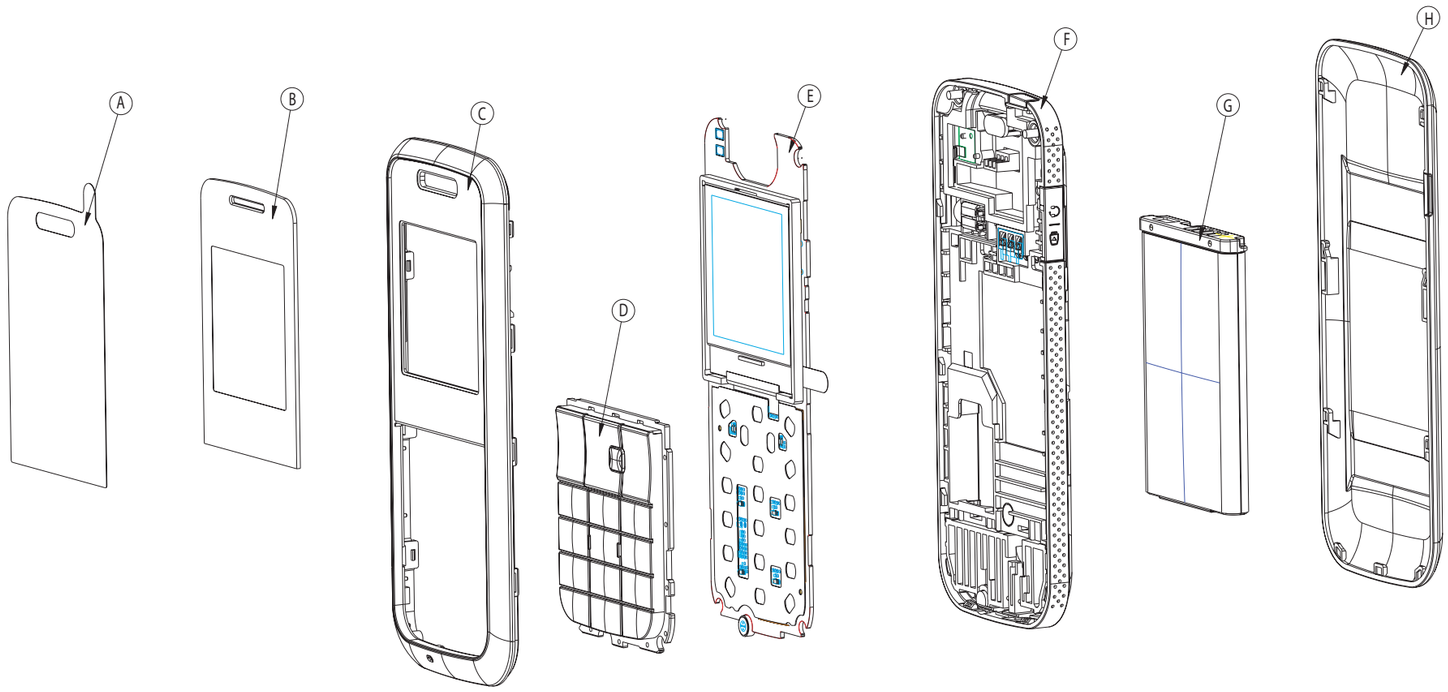
12. EXPLODED VIEW & REPLACEMENT PART LIST

12.1 EXPLODED VIEW



31	COVER,BATTERY	MCJA0099601	1	
30	SCREW	GGZZ0005101	2	
29	BATTERY	SBPL0090501	1	
28	CAP,RECEPTACLE	MCCE0055302	1	
27	ANTENNA, GSM, FIXED	SNGF0053401	1	
26	LABEL,A/S	MLAB0001102	1	
25	PAD (INTENNA)	MPBZ0256701	1	
24	CONNECTOR,ETC	ENZY0021201	1	
23	LENS,FLASH	MLCE0014501	1	
22	COVER,REAR	MCJN011140X	1	
21	ANTENNA, GSM, FIXED(FM RADIO)	SNGF0053801	1	
20	VIBRATOR,MOTOR	SJMY0007905	1	
19	PAD,SPEAKER	MPBN0082301	1	
18	PAD,SPEAKER (Packing Speaker)	MPBN0080001	1	
17	CAN,SHIELD(COVER)	MCBA0060001	1	
16	CAN,SHIELD(FRAME)	MCBA0059901	1	
15-1	INSULATOR	MIDZ0250101	1	
15	TAPE, LCD	MTAZ0268101	1	
14	INSULATOR	MIDZ0235101	1	
13	PCB	SAFF0268801	1	
12	LCD	SVLM0033401	1	
11	DOME ASSY,METAL	ADCA0104401	1	
10	KEYPAD ASSY,MAIN	AKAC000440X	1	
9	SPEAKER	SUSY0028904	1	
8	FILTER,MIC	MFBZ0008001	1	
7	FILTER,SPEAKER	MFBN0079901	1	
6	PAD,CONNECTOR (PAD SPK. CONNECTOR)	MPBU0090001	1	
5	PAD,LCD	MPBG0101001	1	
4	COVER,FRONT	MCJK011630X	1	
3	TAPE,WINDOW	MTAD0116301	1	
2	WINDOW,LCD	MWAC0130001	1	
1	TAPE,PROTECTION	MTAB0371401	1	
No.	DESCRIPTION	DRAWING NO.	Q'TY	REMARK

ASS'Y EXPLODED VIEW



No.	DESCRIPTION	DRAWING NO.	Q'TY	REMARK
H	COVER,BATTERY	MCJA0099601	1	
G	BATTERY PACK	SBPL0090501	1	
F	COVER ASSY,REAR	ACGM015120X	1	
E	PCB ASSY,MAIN	SAFY0362501	1	
D	KEYPAD ASSY,MAIN	AKAC000440X	1	
C	COVER ASSY,FRONT	ACGK015290X	1	
B	WINDOW,LCD	MWAC0130001	1	
A	TAPE,PROTECTION	MTAB0371401	1	

12.2 Replacement Parts <Mechanic component>

Note: This Chapter is used for reference, Part order is ordered by SBOM standard on GCSC

Level	Location No.	Description	Part Number	Spec	Color	Remark
2	AAAY00	ADDITION	AAAY0439701	GS107 SEABK	WITHOUT COLOR	
3	MCJA00	COVER,BATTERY	MCJA0099601	MOLD, PC LUPOY SC-1004A, , , , ,	SILVER	H, 31
3	MLAZ	LABEL	MLAZ0051101	PRINTING, (empty), , , , ,	WITHOUT COLOR	
3	MMBB00	MANUAL,OPERATION	MMBB0366301	PRINTING, (empty), , , , ,	WITHOUT COLOR	
2	APAY00	PACKAGE	APAY0139001	GS107 SEA (EU1/Seal/Corrupad/1200ea)Packing	WITHOUT COLOR	
3	APLY00	PALLET ASSY	APLY0003905	EU1 TYPE_Body(SW)+Cap(EU)+CP_1200EA	WITHOUT COLOR	
4	MPCY	PALLET	MPCY0021602	COMPLEX, (empty), , , , ,	WITHOUT COLOR	
3	MBAD00	BAG,VINYL(PE)	MBAD0005204	COMPLEX, (empty), , , , ,	WITHOUT COLOR	
3	MLAC00	LABEL,BARCODE	MLAC0004541	PRINTING, (empty), , , , ,	Without Color	
3	MLAP	LABEL,UNIT	MLAP0001138	COMPLEX, (empty), , , , ,	WITHOUT COLOR	
3	MLAZ01	LABEL	MLAZ0050901	PRINTING, (empty), , , , ,	WITHOUT COLOR	
2	APEY00	PHONE	APEY0891201	GS107 SEABK	BLACK	
3	ACGK00	COVER ASSY,FRONT	ACGK0152901		BLACK	C
4	MCJK00	COVER,FRONT	MCJK0116301	MOLD, PC LUPOY SC-1004A, , , , ,	BLACK	4
4	MFBZ00	FILTER	MFBZ0008001	COMPLEX, (empty), , , , ,	WITHOUT COLOR	8
4	MPBG00	PAD,LCD	MPBG0101001	COMPLEX, (empty), , , , ,	WITHOUT COLOR	5
4	MPBN00	PAD,SPEAKER	MFBN0079901	COMPLEX, (empty), , , , ,	WITHOUT COLOR	7
4	MPBU00	PAD,CONNECTOR	MPBU0090001	COMPLEX, (empty), , , , ,	WITHOUT COLOR	6
4	MTAD00	TAPE,WINDOW	MTAD0116301	COMPLEX, (empty), , , , ,	WITHOUT COLOR	3
3	ACGM00	COVER ASSY,REAR	ACGM0151201		BLACK	F
4	MCCE00	CAP,RECEPTACLE	MCCE0055301	MOLD, Urethane Rubber S190A, , , , ,	SILVER	28
4	MCJN00	COVER,REAR	MCJN0111401	MOLD, PC LUPOY SC-1004A, , , , ,	SILVER	22

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
4	MLAB	LABEL,A/S	MLAB0001102	C2000 USASV DIA 4.0	WHITE	26
4	MLCE00	LENS,FLASH	MLCE0014501	MOLD, PC LUPOY SC-1004A, , , , ,	WITHOUT COLOR	23
4	MPBN00	PAD,SPEAKER	MPBN0080001	COMPLEX, (empty), , , , ,	WITHOUT COLOR	18
4	MPBN01	PAD,SPEAKER	MPBN0082301	COMPLEX, (empty), , , , ,	WITHOUT COLOR	19
4	MPBZ00	PAD	MPBZ0256701	COMPLEX, (empty), , , , ,	WITHOUT COLOR	25
3	AKAC	KEYPAD ASSY,MAIN	AKAC0004401		BLACK	D, 10
3	GGZZ00	SCREW TAPPING	GGZZ0005101	1.6 mm,4.5 mm,MSWR3(BK) ,N ,+ ,- , ,; ,BH ,+ ,2 ,1.6 ,4.5 ,SWCH ,FZB	WITHOUT COLOR	30
3	MLAA00	LABEL,APPROVAL	MLAA0062303	COMPLEX, (empty), , , , ,	WITHOUT COLOR	
3	MTAB	TAPE,PROTECTION	MTAB0371401	COMPLEX, (empty), , , , ,	WITHOUT COLOR	A, 1
3	MWAC	WINDOW,LCD	MWAC0130001	CUTTING, PMMA MR 200, 0.8, , , ,	BLACK	B, 2
5	ADCA00	DOME ASSY,METAL	ADCA0104401		WITHOUT COLOR	11
5	MCBA00	CAN,SHIELD	MCBA0060001	COMPLEX, (empty), , , , ,	WITHOUT COLOR	17
5	MIDZ00	INSULATOR	MIDZ0235101	COMPLEX, (empty), , , , ,	WITHOUT COLOR	14
5	MIDZ01	INSULATOR	MIDZ0250101	COMPLEX, (empty), , , , ,	WITHOUT COLOR	15-1
5	MTAZ00	TAPE	MTAZ0268101	COMPLEX, (empty), , , , ,	WITHOUT COLOR	15
5	MLAZ00	LABEL	MLAZ0038301	PID Label 4 Array	WITHOUT COLOR	
6	SC201	CAN,SHIELD	MCBA0059901	COMPLEX, (empty), , , , ,	WITHOUT COLOR	16

12.2 Replacement Parts
<Main component>

Note: This Chapter is used for reference, Part order is ordered by SBOM standard on GCSC

Level	Location No.	Description	Part Number	Spec	Color	Remark
1		GSM,BAR/FILP	TGSM0077502		BLACK	
4	SUSY00	SPEAKER	SUSY0028904	PIN ,8 ohm,91 dB,1812 mm,3.0t contact ,; , , , , , , ,[empty]		9
4	ENZY00	CONNECTOR,ETC	ENZY0021201	3 PIN,0.25 mm,ANGLE , ,		24
4	SJMY00	VIBRATOR,MOTOR	SJMY0007905	3 V,0.08 A,5.8*5.1*9 ,cylinder motor ,; ,3V , , ,11000 , , , ,29		20
4	SNGF00	ANTENNA,GSM,FIXED	SNGF0053401	3.0 ,-5.0 dBd,, ,internal, GSM850/900/1800/1900 ,; ,QUAD ,-5.0 ,50 ,3.0		27
4	SNGF01	ANTENNA,GSM,FIXED	SNGF0053801	3.0 ,-5.0 dBd,, ,internal, FM radio, Carrier+FPCB type ,; ,SINGLE ,-5.0 ,50 ,3.0		21
3	SAFY00	PCB ASSY,MAIN	SAFY0362501			E
4	SAFB00	PCB ASSY,MAIN,INSERT	SAFB0111901			
5	BRAH00	RESIN,PC	BRAH0001301	; , , , ,[empty]	Black	
5	SUMY00	MICROPHONE	SUMY0003815	FPCB ,-44 dB,4*1.0 ,TDMA Noise improvement ,; , , ,[empty] ,[empty] , ,FPC		
5	SVLM00	LCD MODULE	SVLM0033401	Main ,1.52 ,128*128 ,35.78*39.7*1.9 ,262K ,TFT ,TM ,LGDP4515 , ,		12
4	SAFF00	PCB ASSY,MAIN,SMT	SAFF0268801			13
5	SAFC00	PCB ASSY,MAIN,SMT BOTTOM	SAFC0142101			
6	C101	CAP,CHIP,MAKER	ECZH0001216	220 nF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C102	CAP,CERAMIC,CHIP	ECCH0000113	18 pF,50V,J,NP0,TC,1005,R/TP		
6	C103	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C104	CAP,CERAMIC,CHIP	ECCH0000113	18 pF,50V,J,NP0,TC,1005,R/TP		
6	C105	CAP,CHIP,MAKER	ECZH0001217	470 nF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C106	CAP,CERAMIC,CHIP	ECCH0005603	2.2 uF,10V ,K ,X5R ,TC ,1608 ,R/TP		
6	C107	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C108	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C109	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C110	CAP,CERAMIC,CHIP	ECCH0000113	18 pF,50V,J,NP0,TC,1005,R/TP		
6	C111	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C112	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C113	CAP,CERAMIC,CHIP	ECCH0000161	33 nF,16V,K,X7R,HD,1005,R/TP		

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	C114	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C115	CAP,CHIP,MAKER	ECZH0001217	470 nF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C116	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C117	CAP,CERAMIC,CHIP	ECCH0002002	47000 pF,10V ,K ,B ,HD ,1005 ,R/TP		
6	C118	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C119	CAP,CHIP,MAKER	ECZH0001216	220 nF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C120	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C121	CAP,CHIP,MAKER	ECZH0000839	4.7 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
6	C122	CAP,CERAMIC,CHIP	ECCH0002002	47000 pF,10V ,K ,B ,HD ,1005 ,R/TP		
6	C123	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C125	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C126	CAP,CHIP,MAKER	ECZH0025502	22000000 pF,6.3V ,M ,X5R ,HD ,2012 ,R/TP ,; ,0.85t ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,[empty]		
6	C127	CAP,CERAMIC,CHIP	ECCH0005603	2.2 uF,10V ,K ,X5R ,TC ,1608 ,R/TP		
6	C128	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C129	CAP,CERAMIC,CHIP	ECCH0000163	47 nF,10V,K,X5R,HD,1005,R/TP		
6	C132	CAP,CERAMIC,CHIP	ECCH0000151	4.7 nF,25V,K,X7R,HD,1005,R/TP		
6	C133	CAP,CERAMIC,CHIP	ECCH0003002	10000000 pF,10V ,Z ,Y5V ,HD ,2012 ,R/TP , , ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,1.25 mm		
6	C134	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C135	CAP,CERAMIC,CHIP	ECCH0005604	10000000 pF,6.3V ,M ,X5R ,TC ,1608 ,R/TP , , ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,0.8 mm		
6	C136	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C201	CAP,CERAMIC,CHIP	ECCH0000138	390 pF,50V,K,X7R,HD,1005,R/TP		
6	C202	CAP,CERAMIC,CHIP	ECCH0000138	390 pF,50V,K,X7R,HD,1005,R/TP		
6	C205	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C207	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C208	CAP,CERAMIC,CHIP	ECCH0000198	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP		
6	C209	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	C210	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C211	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C212	CAP,CERAMIC,CHIP	ECCH0000179	22 nF,16V ,K ,X5R ,HD ,1005 ,R/TP		
6	C213	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	C214	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C216	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	C217	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C218	CAP,CHIP,MAKER	ECZH0000844	68 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C219	CAP,CERAMIC,CHIP	ECCH0006501	10000000 pF,6.3V ,K ,X5R ,TC ,2012 ,R/TP , , ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,1.25 mm		
6	C220	CAP,CERAMIC,CHIP	ECCH0006501	10000000 pF,6.3V ,K ,X5R ,TC ,2012 ,R/TP , , ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,1.25 mm		
6	C221	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C223	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	C225	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C226	CAP,CHIP,MAKER	ECZH0001216	220 nF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C227	CAP,CERAMIC,CHIP	ECCH0000161	33 nF,16V,K,X7R,HD,1005,R/TP		
6	C228	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C233	CAP,CERAMIC,CHIP	ECCH0000161	33 nF,16V,K,X7R,HD,1005,R/TP		
6	C234	CAP,CERAMIC,CHIP	ECCH0005603	2.2 uF,10V ,K ,X5R ,TC ,1608 ,R/TP		
6	C235	CAP,CERAMIC,CHIP	ECCH0003002	10000000 pF,10V ,Z ,Y5V ,HD ,2012 ,R/TP , , ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,1.25 mm		
6	C244	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C245	CAP,CERAMIC,CHIP	ECCH0001001	6.8 pF,50V ,D ,NP0 ,TC ,1005 ,R/TP ,; , ,0.5PF ,50V ,NP0 ,[empty] ,1005 ,R/TP , mm		
6	C247	CAP,CHIP,MAKER	ECZH0003503	1 uF,25V ,K ,X5R ,HD ,1608 ,R/TP		
6	C248	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C249	CAP,CERAMIC,CHIP	ECCH0002002	47000 pF,10V ,K ,B ,HD ,1005 ,R/TP		
6	C251	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C252	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	C253	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	C254	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	C255	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C256	CAP,CERAMIC,CHIP	ECCH0000179	22 nF,16V ,K ,X5R ,HD ,1005 ,R/TP		
6	C257	CAP,CHIP,MAKER	ECZH0003504	100 nF,25V ,K ,X7R ,HD ,1608 ,R/TP		
6	C261	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	C282	CAP,CHIP,MAKER	ECZH0003503	1 uF,25V ,K ,X5R ,HD ,1608 ,R/TP		
6	C283	CAP,CERAMIC,CHIP	ECCH0000198	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP		

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	C285	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	C301	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C303	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C304	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C305	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C306	CAP,CHIP,MAKER	ECZH0000810	9 pF,50V ,D ,NP0 ,TC ,1005 ,R/TP		
6	C308	CAP,CERAMIC,CHIP	ECCH0000161	33 nF,16V,K,X7R,HD,1005,R/TP		
6	C309	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C310	CAP,CHIP,MAKER	ECZH0000810	9 pF,50V ,D ,NP0 ,TC ,1005 ,R/TP		
6	C311	CAP,CHIP,MAKER	ECZH0000810	9 pF,50V ,D ,NP0 ,TC ,1005 ,R/TP		
6	C312	CAP,CHIP,MAKER	ECZH0000810	9 pF,50V ,D ,NP0 ,TC ,1005 ,R/TP		
6	C313	CAP,CERAMIC,CHIP	ECCH0000701	1.2 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
6	C314	CAP,CERAMIC,CHIP	ECCH0003002	10000000 pF,10V ,Z ,Y5V ,HD ,2012 ,R/TP , , ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,1.25 mm		
6	C319	INDUCTOR,CHIP	ELCH0001417	33 nH,J ,1005 ,R/TP ,PBFREE		
6	C320	CAP,CHIP,MAKER	ECZH0001002	0.5 pF,50V ,B ,NP0 ,TC ,1005 ,R/TP		
6	C321	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C323	CAP,CHIP,MAKER	ECZH0000813	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C324	CAP,CHIP,MAKER	ECZH0001217	470 nF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C326	CAP,CHIP,MAKER	ECZH0001217	470 nF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C327	CAP,CHIP,MAKER	ECZH0000841	56 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C406	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C407	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C408	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C420	CAP,CERAMIC,CHIP	ECCH0000112	15 pF,50V,J,NP0,TC,1005,R/TP		
6	C421	CAP,CERAMIC,CHIP	ECCH0000112	15 pF,50V,J,NP0,TC,1005,R/TP		
6	C423	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C430	CAP,CERAMIC,CHIP	ECCH0000112	15 pF,50V,J,NP0,TC,1005,R/TP		
6	C431	CAP,CERAMIC,CHIP	ECCH0000112	15 pF,50V,J,NP0,TC,1005,R/TP		
6	C432	CAP,CERAMIC,CHIP	ECCH0000112	15 pF,50V,J,NP0,TC,1005,R/TP		
6	C433	CAP,CERAMIC,CHIP	ECCH0000112	15 pF,50V,J,NP0,TC,1005,R/TP		
6	C434	CAP,CERAMIC,CHIP	ECCH0000112	15 pF,50V,J,NP0,TC,1005,R/TP		

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	C435	CAP,CERAMIC,CHIP	ECCH0000112	15 pF,50V,J,NP0,TC,1005,R/TP		
6	C436	CAP,CERAMIC,CHIP	ECCH0000112	15 pF,50V,J,NP0,TC,1005,R/TP		
6	C437	CAP,CERAMIC,CHIP	ECCH0000112	15 pF,50V,J,NP0,TC,1005,R/TP		
6	C438	CAP,CERAMIC,CHIP	ECCH0000198	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP		
6	C439	CAP,CERAMIC,CHIP	ECCH0000112	15 pF,50V,J,NP0,TC,1005,R/TP		
6	C440	CAP,CERAMIC,CHIP	ECCH0000112	15 pF,50V,J,NP0,TC,1005,R/TP		
6	C441	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C442	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C443	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	CN201	CONNECTOR,I/O	ENRY0008801	5 , mm,ANGLE , , ,; , ,0.64MM ,ANGLE ,[empty] ,DIP ,[empty] ,		
6	CN401	CONNECTOR,FFC/FPC	ENQY0014901	35 ,0.3 mm,ETC , , ,; , ,0.30MM ,FPC ,STRAIGHT ,BOTH ,SMD ,R/TP ,[empty] ,		
6	FB101	FILTER,BEAD,CHIP	SFBH0007103	75 ohm,1005 ,CHIP BEAD, 300mA		
6	FB201	FILTER,BEAD,CHIP	SFBH0008101	600 ohm,1005 ,		
6	FB202	FILTER,BEAD,CHIP	SFBH0008101	600 ohm,1005 ,		
6	FB203	FILTER,BEAD,CHIP	SFBH0007101	120 ohm,1005 ,Ferrite Bead		
6	FL301	FILTER,SAW,DUAL	SFSB0001401	942.5 MHz,35 MHz,2.1 dB,20 dB,1842.5 MHz,75 MHz,2.3 dB,12 dB,2.0*1.6*0.68 ,SMD ,925M~960M,1805M~1880M,10p,B,150_82,150_15,EGSM+DCS Rx ,; ,942.5, 1842.5 ,2.0*1.6*0.68 ,SMD ,R/TP		
6	J201	CONN,SOCKET	ENSY0025101	6 ,ETC , ,2.54 mm,6pin, 1.8t, Bridge Type, Stopper		
6	L101	INDUCTOR,SMD,POWER	ELCP0008003	3.3 uH,M ,2.5*2.0*1.0 ,R/TP ,Chip power		
6	L201	INDUCTOR,CHIP	ELCH0001403	1 nH,S ,1005 ,R/TP ,PBFREE		
6	L202	INDUCTOR,CHIP	ELCH0001512	180 nH,J ,1608 ,R/TP ,PBFREE		
6	L203	INDUCTOR,CHIP	ELCH0001403	1 nH,S ,1005 ,R/TP ,PBFREE		
6	L301	INDUCTOR,CHIP	ELCH0001425	82 nH,J ,1005 ,R/TP ,PBFREE		
6	L302	INDUCTOR,CHIP	ELCH0001052	18 nH,J ,1005 ,R/TP ,PBFREE		
6	L303	INDUCTOR,CHIP	ELCH0003816	3.6 nH,S ,1005 ,R/TP ,		
6	L304	INDUCTOR,CHIP	ELCH0004707	1.5 nH,S ,1005 ,R/TP ,		
6	L305	INDUCTOR,CHIP	ELCH0004721	2.2 nH,S ,1005 ,R/TP ,		
6	L306	INDUCTOR,CHIP	ELCH0004721	2.2 nH,S ,1005 ,R/TP ,		
6	L308	INDUCTOR,CHIP	ELCH0004720	1.2 nH,S ,1005 ,R/TP ,		
6	L309	INDUCTOR,CHIP	ELCH0005004	22 nH,J ,1005 ,R/TP ,		
6	L313	INDUCTOR,CHIP	ELCH0003848	220 nH,J ,1005 ,R/TP ,chip inductor		

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	LD401	DIODE,LED,CHIP	EDLH0015202	white ,ETC ,R/TP ,2.8x0.88x0.6t ,; ,[empty] ,2.8~3.3V ,30mA ,1000~1720mcd , ,110mW ,[empty] ,R/TP ,2P		
6	Q101	TR,BJT,NPN	EQBN0020501	ESM ,0.15 W,R/TP , ,; ,NPN ,5V ,60V ,50V ,150mA ,0.1uA MAX ,10 MIN 700 MAX ,100mW ,ESM ,R/TP ,3P		
6	Q201	TR,BJT,PNP	EQBP0006301	, W,R/TP ,		
6	Q202	TR,BJT,NPN	EQBN0020501	ESM ,0.15 W,R/TP , ,; ,NPN ,5V ,60V ,50V ,150mA ,0.1uA MAX ,10 MIN 700 MAX ,100mW ,ESM ,R/TP ,3P		
6	Q203	TR,BJT,PNP	EQBP0006301	, W,R/TP ,		
6	Q204	TR,BJT,NPN	EQBN0020501	ESM ,0.15 W,R/TP , ,; ,NPN ,5V ,60V ,50V ,150mA ,0.1uA MAX ,10 MIN 700 MAX ,100mW ,ESM ,R/TP ,3P		
6	Q301	TR,BJT,NPN	EQBN0019201	VSM ,0.1 W,R/TP ,1.2*1.2*0.5 Vcbo=20, Vceo=12, Vebo=2V, Ic=100mA		
6	R102	RES,CHIP,MAKER	ERHZ0000475	3900 ohm,1/16W ,J ,1005 ,R/TP		
6	R105	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R106	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R107	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R108	RES,CHIP,MAKER	ERHZ0000529	1.5 Kohm,1/16W ,J ,1005 ,R/TP		
6	R109	RES,CHIP,MAKER	ERHZ0000484	470 ohm,1/16W ,J ,1005 ,R/TP		
6	R111	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R112	RES,CHIP,MAKER	ERHZ0000476	39 Kohm,1/16W ,J ,1005 ,R/TP		
6	R114	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R116	RES,CHIP,MAKER	ERHZ0000405	10 Kohm,1/16W ,J ,1005 ,R/TP		
6	R117	RES,CHIP,MAKER	ERHZ0000405	10 Kohm,1/16W ,J ,1005 ,R/TP		
6	R203	RES,CHIP,MAKER	ERHZ0000443	2200 ohm,1/16W ,J ,1005 ,R/TP		
6	R204	RES,CHIP,MAKER	ERHZ0000405	10 Kohm,1/16W ,J ,1005 ,R/TP		
6	R205	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R206	RES,CHIP,MAKER	ERHZ0000485	4700 ohm,1/16W ,J ,1005 ,R/TP		
6	R209	RES,CHIP	ERHY0000254	4.7K ohm,1/16W,J,1005,R/TP		
6	R215	RES,CHIP,MAKER	ERHZ0000488	4.7 ohm,1/16W ,J ,1005 ,R/TP		
6	R216	RES,CHIP,MAKER	ERHZ0000488	4.7 ohm,1/16W ,J ,1005 ,R/TP		
6	R217	RES,CHIP,MAKER	ERHZ0003001	30 Kohm,1/16W ,F ,1005 ,R/TP		
6	R218	RES,CHIP,MAKER	ERHZ0000203	10 Kohm,1/16W ,F ,1005 ,R/TP		
6	R219	RES,CHIP,MAKER	ERHZ0000203	10 Kohm,1/16W ,F ,1005 ,R/TP		
6	R220	RES,CHIP,MAKER	ERHZ0000402	10 ohm,1/16W ,J ,1005 ,R/TP		
6	R223	RES,CHIP,MAKER	ERHZ0000204	100 Kohm,1/16W ,F ,1005 ,R/TP		

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	R225	RES,CHIP	ERHY0000161	200K ohm,1/16W,F,1005,R/TP		
6	R229	RES,CHIP,MAKER	ERHZ0000405	10 Kohm,1/16W ,J ,1005 ,R/TP		
6	R231	RES,CHIP,MAKER	ERHZ0000294	5100 ohm,1/16W ,F ,1005 ,R/TP		
6	R233	RES,CHIP,MAKER	ERHZ0000211	1200 ohm,1/16W ,F ,1005 ,R/TP		
6	R240	RES,CHIP,MAKER	ERHZ0003001	30 Kohm,1/16W ,F ,1005 ,R/TP		
6	R241	RES,CHIP,MAKER	ERHZ0000405	10 Kohm,1/16W ,J ,1005 ,R/TP		
6	R242	RES,CHIP,MAKER	ERHZ0000204	100 Kohm,1/16W ,F ,1005 ,R/TP		
6	R245	RES,CHIP,MAKER	ERHZ0000443	2200 ohm,1/16W ,J ,1005 ,R/TP		
6	R247	RES,CHIP,MAKER	ERHZ0000405	10 Kohm,1/16W ,J ,1005 ,R/TP		
6	R248	RES,CHIP,MAKER	ERHZ0000402	10 ohm,1/16W ,J ,1005 ,R/TP		
6	R265	RES,CHIP,MAKER	ERHZ0000485	4700 ohm,1/16W ,J ,1005 ,R/TP		
6	R266	RES,CHIP,MAKER	ERHZ0000486	47 Kohm,1/16W ,J ,1005 ,R/TP		
6	R267	RES,CHIP,MAKER	ERHZ0000486	47 Kohm,1/16W ,J ,1005 ,R/TP		
6	R268	RES,CHIP,MAKER	ERHZ0000486	47 Kohm,1/16W ,J ,1005 ,R/TP		
6	R269	RES,CHIP,MAKER	ERHZ0000486	47 Kohm,1/16W ,J ,1005 ,R/TP		
6	R270	RES,CHIP,MAKER	ERHZ0000405	10 Kohm,1/16W ,J ,1005 ,R/TP		
6	R302	RES,CHIP,MAKER	ERHZ0000404	1 Kohm,1/16W ,J ,1005 ,R/TP		
6	R305	RES,CHIP,MAKER	ERHZ0000201	100 ohm,1/16W ,F ,1005 ,R/TP		
6	R307	RES,CHIP,MAKER	ERHZ0000201	100 ohm,1/16W ,F ,1005 ,R/TP		
6	R308	RES,CHIP,MAKER	ERHZ0000201	100 ohm,1/16W ,F ,1005 ,R/TP		
6	R309	RES,CHIP,MAKER	ERHZ0000449	24 Kohm,1/16W ,J ,1005 ,R/TP		
6	R310	RES,CHIP,MAKER	ERHZ0000531	270 ohm,1/16W ,J ,1005 ,R/TP		
6	R311	RES,CHIP,MAKER	ERHZ0000485	4700 ohm,1/16W ,J ,1005 ,R/TP		
6	R312	RES,CHIP,MAKER	ERHZ0003801	5.1 ohm,1/16W ,J ,1005 ,R/TP		
6	R402	RES,CHIP	ERHY0000128	15K ohm,1/16W,F,1005,R/TP		
6	R404	RES,CHIP,MAKER	ERHZ0000485	4700 ohm,1/16W ,J ,1005 ,R/TP		
6	R405	RES,CHIP,MAKER	ERHZ0000486	47 Kohm,1/16W ,J ,1005 ,R/TP		
6	R432	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R433	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R434	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R435	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R436	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	R437	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R438	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R439	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R441	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R442	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R443	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R444	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R448	RES,CHIP,MAKER	ERHZ0000485	4700 ohm,1/16W ,J ,1005 ,R/TP		
6	R449	RES,CHIP,MAKER	ERHZ0000405	10 Kohm,1/16W ,J ,1005 ,R/TP		
6	SW301	CONN,RF SWITCH	ENWY0007601	,SMD , dB, ,; ,0.40MM ,STRAIGHT ,SOCKET ,SMD ,R/TP ,AU , ,		
6	U101	IC	EUSY0391901	BGA ,10 ,R/TP ,EGV3, ULC GSM one chip, 8x8,183pin ,; ,IC,Digital Baseband Processor		
6	U102	IC	EUSY0404301	FBGA ,52 ,ETC ,FULLY 1.8V ADMUX 32M (2Mx16) NOR + 16M (2Mx8) UtRAM2 ,; ,IC,MCP		
6	U201	IC	EUSY0347001	MiniQFN-10L ,10 PIN,R/TP ,1.8X1.4X0.55,0.6 Dual SPDT Analog Switch ,; ,IC,Analog Switch		
6	U203	IC	EUSY0398301	QFN ,18 ,R/TP ,MUIC-Lite ,; ,IC,Analog Switch		
6	U204	IC	EUSY0404001	BGA ,8 ,R/TP ,Class AB SPK Amp ,; ,IC,Audio Amplifier		
6	U205	IC	EUSY0410801	DFN ,10 ,R/TP ,DFN Cal Test Mode Single Charger IC for Micro USB ,; ,IC,Charger		
6	U301	RF MODULE,HANDSET	SMRH0006001	MHz, MHz, ,GSM Dual Band Tx Module for EU. 6x7		
6	U402	IC	EUSY0238704	SC70JW ,10 ,R/TP ,2ch charge pump ,; ,IC,Charge Pump		
6	U406	IC	EUSY0372801	PLP1010 ,4 ,R/TP ,150mA Single LDO ,; ,IC,LDO Voltage Regulator		
6	VA203	VARISTOR	SEVY0004101	5.6 V, ,SMD ,360pF, 1005		
6	VA204	VARISTOR	SEVY0004101	5.6 V, ,SMD ,360pF, 1005		
6	VA205	DIODE,TVS	EDTY0008606	DFN-2 ,7.82 V,150 mW,R/TP ,PB-FREE		
6	VA206	DIODE,TVS	EDTY0008606	DFN-2 ,7.82 V,150 mW,R/TP ,PB-FREE		
6	X101	X-TAL	EXXY0004602	.032768 MHz,20 PPM,12.5 pF,65000 ohm,SMD ,6.9*1.4*1.3 ,		
6	X102	X-TAL	EXXY0018404	26 MHz,10 PPM,8 pF,40 ohm,SMD ,3.2*2.5*0.6 ,12ppm at -30'C ~ +85'C, C0 1.0pF, C1 3.6fF ,; ,26 ,10PPM ,8 , , ,SMD ,R/TP		
5	SAFD00	PCB ASSY,MAIN,SMT TOP	SAFD0139601			
6	C131	CAP,CHIP,MAKER	ECZH0001216	220 nF,10V ,K ,X5R ,TC ,1005 ,R/TP		

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	C206	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C215	CAP,CERAMIC,CHIP	ECCH0000161	33 nF,16V,K,X7R,HD,1005,R/TP		
6	C222	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C224	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C229	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C230	CAP,CERAMIC,CHIP	ECCH0000161	33 nF,16V,K,X7R,HD,1005,R/TP		
6	C231	CAP,CERAMIC,CHIP	ECCH0005604	10000000 pF,6.3V ,M ,X5R ,TC ,1608 ,R/TP , , ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,0.8 mm		
6	C236	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	C238	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	C239	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	C241	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	C242	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	C243	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	C246	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C258	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C260	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	LD201	DIODE,LED,CHIP	EDLH0015101	BLUE ,1608 ,R/TP ,Topview LED ,; ,BLUE ,2.7~3.2V ,25mA ,18~45mcd ,465~475nm ,95mW ,[empty] ,[empty] ,2P		
6	LD202	DIODE,LED,CHIP	EDLH0015101	BLUE ,1608 ,R/TP ,Topview LED ,; ,BLUE ,2.7~3.2V ,25mA ,18~45mcd ,465~475nm ,95mW ,[empty] ,[empty] ,2P		
6	LD203	DIODE,LED,CHIP	EDLH0015101	BLUE ,1608 ,R/TP ,Topview LED ,; ,BLUE ,2.7~3.2V ,25mA ,18~45mcd ,465~475nm ,95mW ,[empty] ,[empty] ,2P		
6	LD204	DIODE,LED,CHIP	EDLH0015101	BLUE ,1608 ,R/TP ,Topview LED ,; ,BLUE ,2.7~3.2V ,25mA ,18~45mcd ,465~475nm ,95mW ,[empty] ,[empty] ,2P		
6	LD205	DIODE,LED,CHIP	EDLH0015101	BLUE ,1608 ,R/TP ,Topview LED ,; ,BLUE ,2.7~3.2V ,25mA ,18~45mcd ,465~475nm ,95mW ,[empty] ,[empty] ,2P		
6	LD206	DIODE,LED,CHIP	EDLH0015101	BLUE ,1608 ,R/TP ,Topview LED ,; ,BLUE ,2.7~3.2V ,25mA ,18~45mcd ,465~475nm ,95mW ,[empty] ,[empty] ,2P		
6	R210	RES,CHIP,MAKER	ERHZ0000443	2200 ohm,1/16W ,J ,1005 ,R/TP		
6	R211	RES,CHIP,MAKER	ERHZ0000404	1 Kohm,1/16W ,J ,1005 ,R/TP		
6	R212	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R213	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R214	RES,CHIP,MAKER	ERHZ0000443	2200 ohm,1/16W ,J ,1005 ,R/TP		

12. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	R221	RES,CHIP,MAKER	ERHZ0000496	560 ohm,1/16W ,J ,1005 ,R/TP		
6	R222	RES,CHIP,MAKER	ERHZ0000496	560 ohm,1/16W ,J ,1005 ,R/TP		
6	R224	RES,CHIP,MAKER	ERHZ0000496	560 ohm,1/16W ,J ,1005 ,R/TP		
6	R227	RES,CHIP,MAKER	ERHZ0000496	560 ohm,1/16W ,J ,1005 ,R/TP		
6	R228	RES,CHIP,MAKER	ERHZ0000496	560 ohm,1/16W ,J ,1005 ,R/TP		
6	R230	RES,CHIP,MAKER	ERHZ0000496	560 ohm,1/16W ,J ,1005 ,R/TP		
6	SPFY	PCB,MAIN	SPFY0212101	FR-4 ,0.8 mm,BUILD-UP 4 ,V40,; , , , , , , , ,		
6	VA201	VARISTOR	SEVY0003901	5.5 V, ,SMD ,Vdc 5.5, Vb 8, Cp 420, 1.0*0.5*0.6 , ,5.5 , ,480 ,1.0*0.5*0.6 ,[empty] ,SMD ,R/TP		
6	VA202	VARISTOR	SEVY0003901	5.5 V, ,SMD ,Vdc 5.5, Vb 8, Cp 420, 1.0*0.5*0.6 , ,5.5 , ,480 ,1.0*0.5*0.6 ,[empty] ,SMD ,R/TP		

12.3 Accessory

Note: This Chapter is used for reference, Part order is ordered by SBOM standard on GCSC

Level	Location No.	Description	Part Number	Spec	Color	Remark
3	SBPL00	BATTERY PACK,LI-ION	SBPL0090501	3.7 V,950 mAh,1 CELL,PRISMATIC ,KU250 Europe BATT, IP, Pb-Free ,; ,3.7 ,950 ,0.2C ,PRISMATIC ,50x34x55 , ,BLACK ,Innerpack ,Europe Label	Black	G, 29
		BATTERY PACK,LI-ION	SBPL0091401	3.7 V,950 mAh,1 CELL,PRISMATIC ,KU250 BATT, Europe, Pb-Free ,; ,3.7V ,950mAh ,0.2C ,PRISMATIC ,50x34x55 , ,BLACK ,Innerpack ,Europe Label	BLACK	
3	SGEY00	EAR PHONE/EAR MIKE SET	SGEY0003218	; ,. ,. ,. ,. ,. ,[empty] ,BLACK ,5P MICRO USB CONNECTOR ,5P ,Earphone,Stereo		
3	SSAD00	ADAPTOR,AC-DC	SSAD0034901	100-240V ,5060 Hz,4.8 V,0.4 A,GOST ,AC-DC ADAPTOR ,; ,90Vac~264Vac ,4.8Vdc ,400mA ,5060 ,CB ,WALL 2P ,USB ,		
		ADAPTOR,AC-DC	SSAD0034902	100-240V ,5060 Hz,4.8 V,.4 A,GOST ,AC-DC ADAPTOR ,; ,150Vac~350Vac ,4.8Vdc ,400mA ,5060 ,CB ,WALL 2P ,USB ,		